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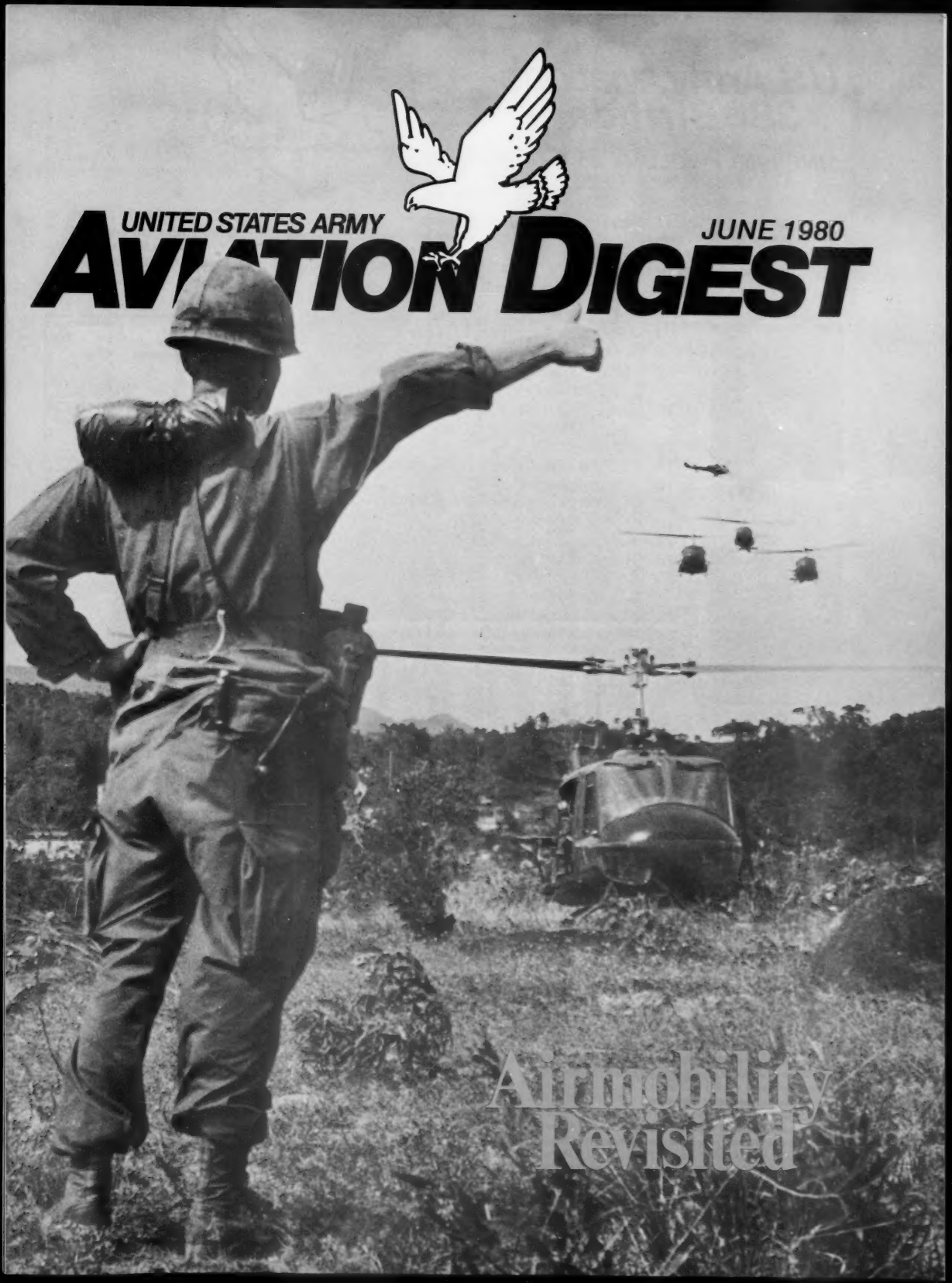

Airmobility Revisited

U.S. Army Aviation's 38th Birthday

JUNE 1980 • VOLUME 26 • NUMBER 6

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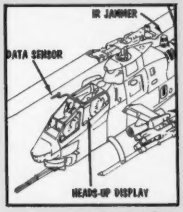

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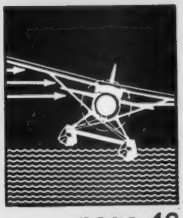

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Cover: **UH-1 Hueys land troops of the 1st Cavalry Division (Airmobile) in Vietnam in 1967 during a search and destroy mission near Chu Lai. This month, to commemorate the 38th Birthday of Army Aviation, the *Aviation Digest* features Part 1 of an article by General Kinnard who recalls the emerging concepts of airmobility when he commanded the 11th Air Assault Division (T) and the 1st Cav which he led into combat in Vietnam**

Richard K. Tierney
Editor

The mission of the ***U.S. Army Aviation Digest (USPS 415-350)*** is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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Airmobility Revisited

part 1

Lieutenant General Harry W. O. Kinnard (R)

General Douglas MacArthur will be long remembered for citing the aphorism that "Old Soldiers never die . . . ." If their death is uncertain, it is as sure as taxes that old Soldiers never miss a chance to tell war stories. Equally certain, these reminiscences improve with repetition. No wonder, then, that days and doings of the 11th Air Assault Division (Test) and 1st Cavalry Division (Airmobile)—which we usually called the First Air Cav Division—are frequent on my lips, and that by now all that was done has taken on the rosy gloss of constant repolishing. Furthermore, loath as I am to admit it, those days are now sometime ago. Even so, some looking back—and forward—may produce a useful thought or two on Army Aviation now and in the future.

Airmobility Revisited

THROUGHOUT THE very long history of soldiering, Soldiers constantly have been alert for better ways to fight. They have continually experimented with equipment, organization, tactics, doctrine, training, and with techniques—all to overcome three adversaries: the enemy, the weather and the terrain. The main focus was on the likely enemy and how to gain an advantage when the battle was joined. The weather was approached as something to be borne and coped with, primarily by improved equipment. Similarly for terrain, the search was for all-terrain equipment and better ways to use terrain. High ground early became a good thing to have and hold—or worth a fight, if necessary, to become king of the hill.

And, typically, combat improvements were evolutionary with only occasional revolutionary jumps caused by gunpowder, rifled barrels, internal combustion engines, rapid fire weapons, tracks, flying machines, fission/fusion weapons and other improvements. Such a revolutionary breakthrough was the helicopter, and especially the helicopter combined with the gas turbine engine. Here was a chance for Soldiers very nearly to eliminate the third adversary—terrain. Here was "portable high ground." Here was a device so uniquely flexible that it offered that rare chance to improve land combat in all of its five functions:

- mobility;
- firepower;
- logistics;
- intelligence;
- and, command, control and communications.

All of this was true because for the very first time (leaving out tethered balloons) there was available a machine that could position itself above the ground while remaining motionless with respect to that ground. This ability to hover had a great added virtue in permitting a helicopter to stop and then land, instead of landing and stopping (or being stopped) as do fixed wing aircraft. A bonus capability is that a helicopter can land safely by autorotation even when its engine is out of commission.

No wonder, then, that Soldiers quickly recognized great promise in even the early, primitive helicopters. No wonder they liked it better and better as it improved in all its performance characteristics and became more and more reliable and easier to maintain and to fly. And, no wonder they rapidly innovated new uses that quickly spanned all five functions of combat.

Helicopter experiments prior to the 11th Air Assault Division (AAD) testing were many and important but they lacked structure and thrust or focus. When in the early 1960s, the Office of the Secretary of Defense chided the Army for its failure to capitalize on its aviation, the Army seized the opportunity to provide the missing focus and thrust. The Howze Board (the Army Tactical Mobility Requirements Board) provided the broad analytical objectives and directions and a line of departure for comprehensive test and development. The 11th Air Assault Division and the attached 10th

LEFT: A UH-1D Huey of the 1st Cavalry Division (Airmobile) resupplies Company A, 1st Battalion, 7th Cavalry Regiment during operations near An Khe in 1967 in Vietnam

Air Transport Brigade were created as vehicles to further develop and test two of the three Army Aviation organizations postulated by the Howze Board. Unfortunately, the development and testing of the third recommended organization, an air cavalry combat brigade, was indefinitely postponed.

The phrase "develop and test" is used above to emphasize that, as good as the ideas of the Howze Board were, they were in need of a great deal of development across the board, not just testing. In other words, the work of the 11th Air Assault Division and the 10th Air Transport Brigade was much more concerned with iterative trial-and-error improvement than with simple go, no-go testing. This was true of the equipment, the doctrine, the techniques, the tactics and the organizations themselves.

Very fortunately, as commander of the test organizations, I was given the latitude to do much more than merely test an established organization of fixed structure, known equipment and predetermined doctrine, tactics and technique. My marching orders, given me personally by then Chief of Army Staff, General Earl Wheeler, were, in my mind, ideal in their brevity, scope and latitude. "Harry," he said, "I want you to determine how far and how fast the Army can go, and should go, in embracing airmobility." My answer was a delighted, even briefer, "Yes, sir!" General Wheeler added more great news; I would have really topnotch people, with the quite unusual chance to pick many of them, including noncommissioned officers, by name.

Also of importance was a fund ($1.2 million, as I recall) set up to permit us to improvise, modify or substitute equipment unique to a force placing prime reliability on helicopters. As time went on the use of this fund was simplified and formalized by establishing, at Ft. Benning, GA, a liaison office of the Army Materiel Command (AMC) adjacent to our 11th Air Assault Division headquarters. This AMC office made it possible to rapidly search the inventories of all U.S. services plus those of some of our allies for likely items of lightweight equipment. This office then handled the paperwork of procuring such special equipment as we wanted to test. And finally, this office handled the expenditures from our fund to purchase off-the-shelf items or to pay for modifications to standard items to make them suitable for airmobile operations.

There's that word again—airmobile. General Wheeler had said airmobility and I had "Yes sirred" without a real understanding of the word. For that matter, I'm not sure General Wheeler had a precise connotation clearly in mind when he used airmobility. Without belaboring the point, the meaning which we finally derived and used to guide our efforts was that airmobility meant using Army aircraft whenever and however they improved our Army's ability to fight. This had importance because previously Army aircraft were purely supplemental adjuncts to ground combat. Now we could develop and test organizations placing principal reliance on Army aircraft to perform all the functions of land combat. And if you don't think that idea is different in kind, not just in degree, you have never had the questionable pleasure that was mine of persuading an old line Artilleryman that in our unit he would have no prime movers for his artillery, per se, but would receive CH-47 Chinooks "on a timely basis" to slingload his pieces into and out of position.

And speaking of Chinooks (Hooks), and since lightweight must be the middle name of an air assault division, one of the mottoes that we coined was: "If you can't slingload it on a Hook, you're better off without it." But saying that, and believing it, was one thing; obtaining suitable lightweight equipment was quite another matter. We worked hard on this and came up with air portable maintenance shelters, a signal battalion whose largest vehicle was a jeep, sectionalized engineer equipment whose heaviest section could be slingloaded on a Hook, rubber fuel bladders, and a long, long list of other items. But in honesty we only scratched the surface and much remains to be done, even now.

Thinking "light" bore another important fruit; we found in the helicopter the means to reconvert our Infantrymen from the beasts of burden we had made of them back into lightly equipped, fast stepping, truly foot-mobile Infantrymen. Again, selling this idea was not easy. Soldiers who have endured a cold, wet night without their rations or bedrolls are hard to convince that they can count on having these brought forward to them when

ELOW: UH-1D helicopters land 9th Cav troops the 1st Cavalry Division (Airmobile) during peration Pershing in 1967 in Vietnam

needed. Selling was difficult; making it come true—*all the time*—was even harder, but the dividends are big. Sadly this lesson, like so many, must be relearned ad nauseam.

I particularly urged my commanders both to practice initiative and to encourage it in their subordinates. This was not solely to improve our problem solving; in World War II I had sensed that initative at all levels pays handsome combat dividends in direct proportion to the pace and complexity of the battle. I felt, and still feel, that a high degree of initiative in our military forces may be our most important advantage over a rigidly controlled enemy.

My splendid commanders and staff quickly picked up and amplified the importance of initiative in particular and imaginuity in general.

Defining airmobility and pushing for a lightweight approach to units like ours was only a small segment of a larger overall approach to our mission. We strove from the outset to encourage initiative, innovation and imagination. We even coined a word meant to capture this thought —*imaginuity*. A bit corny maybe, but it helped. I personally spoke to every man when he joined our units to imbue in him the importance of our work and to elicit his personal participation in improving some portion, however small, of how we functioned. My splendid subordinate commanders amplified and expanded on this approach. To give emphasis to this approach we instituted an ideas center where our people could air their ideas, receive a hearing and help if needed. The response was most heartening. The vast majority of our people were anxious to contribute and many did. Some of the ideas were as simple as placing the business end of that well-known plunger, "the plumber's friend," over the nozzle of our field fuel pumps. This kept flying dust and debris out of the fuel tanks and permitted us to refuel without shutting down our helicopter engines, thus speeding up the turnaround. Some of the ideas were much more complicated and took a great deal of doing. Among the dozens of such ideas were these:

(1) Medical pods and communications pods transportable under our CH-54 Tarhe (Skycrane).

(2) Airborne relays in helicopters and CV-2 Caribou.

(3) Modular communications packs for our command helicopters.

(4) Powered wheels for helicopters to permit easier ground movement.

(5) A Chinook ladder for entering or leaving a hovering Hook.

All of these ideas worked well except number 4 which is still, I feel, a deficiency. The perfection of such wheels would permit rapid concealment of helicopters from enemy intelligence or make it easier to place them in protective revetments or other cover. This would be a significant advantage in a European war.

I would stress that by no means was all our effort and thinking directed at materiel problems. Great attention also was given to techniques, tactics, doctrine and organization. We worked to develop what we called an *airmobile state of mind.* This involved thinking about ground combat in new ways based on the capabilities and limitations of helicopters. In the broad sense this included visualizing distance not in miles but in minutes of flight; thinking of routes of approach not as roads or bridges or swamps, mountains and rivers; rather we learned to think in terms of suitable, three-dimensional air corridors, taking into account such parameters as hostile air defenses, best nap-of-the-earth approaches, landing zones, weather and wind direction, coordination of airspace with our artillery and friendly air, best aircraft formations, need for gunship escort, planning friendly fires in the objective area, etc.

Another aspect of the airmobile state of mind was inherent in our definition of airmobility as, "using Army aircraft whenever and however they improved our ability to fight." Such a definition made clear the need for a comprehensive checklist or matrix of ground combat to ensure that no area was overlooked. We used the five functions of combat as our principle matrix. This meant that we were always on the lookout for new or better ways to use helicopters in all functions of combat. This paid big dividends in a sort of synergism of progress. As we developed airmobile logistics that could keep pace with our operational needs

RIGHT: 11th Air Assault Division (T) CH-47 Chinooks—or Hooks—were part of an extensive program during tests to slingload all types of equipment to support the ground Soldier. One of the 11th's mottoes was, "If you can't slingload it on a Hook, you're better off without it." FAR RIGHT: CH-47 Chinook ladders were tested by the 11th Air Assault Division (T) and were effectively used as shown here by troops of the 1st Cavalry Division (Airmobile).

Airmobility: *"Using Army aircraft whenever and however they improve our Army's ability to fight"*

we could range farther and faster with more aircraft available. As we improved our airmobile intelligence we reduced our losses and inflicted more on the enemy. As we adapted our communications for airmobile use we had far better command and control than we had ever enjoyed, and again, wider ranging, faster moving operations became a reality. As we perfected the teamwork between our ground and aviation units, it became routine to organize task organizations very quickly and markedly increase our tempo. As we learned to use rappeling and Chinook ladders, we found we could land almost anywhere. Improved engineer equipment meant we could quickly expand a small hole in the trees (blown by a bomb if necessary) into a usable landing zone. Last, but certainly not least, was an unending search to improve the firepower function with Army aircraft. Our efforts here were across the board. We slingloaded 155 millimeter (mm) towed artillery to positions on mountains that would never have seen artillery any other way. We worked out optimum slingloading of ammunition. We were constantly reporting deficiencies in the 2.75 inch rockets and attempting to improve the aerial rocket artillery and what we then called gunships, as to their armaments.

Certainly the biggest forward stride was the development and introduction of a dedicated gunship, the AH-1 Cobra, into the Army. Unfortunately, I had left Vietnam before its advent. I did and do strongly support the introduction of the Cobra and its improved follow-on versions and the Army efforts to field an advanced gunship—first the AH-56A Cheyenne and now the AH-64 advanced attack helicopter. But I have a word of warning: I have noted among many, a tendency for sometime now to speak and think of attack helicopters as if they are the only helicopters worth mentioning. My caution is that we must continue to think of Army Aviation and airmobility as being all inclusive of the five functions of combat. If we stress attack helicopters while forgetting their airborne means of support inherent in the other four functions of combat, *we will never develop the full potential of our attack helicopters* and besides we will overlook the enormous potential of a fully rounded airmobile force.

Besides focusing on the five combat functions we realized that two related areas must receive our con-

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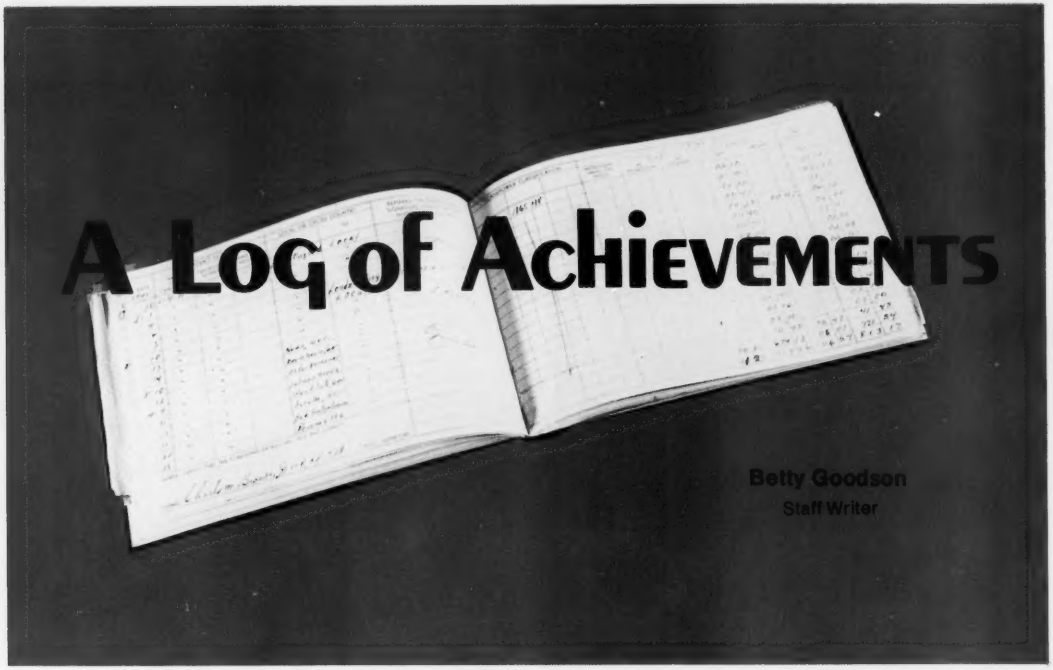


A Log of Achievements

Betty Goodson
Staff Writer

"I AM GOING TO make history" could well have been the thought of Second Lieutenant Charles N. Brown Jr. when he reported to the Army Air Forces Liaison Pilot Training Detachment at Pittsburg, KS, in April 1943, because he did just that.

His name is inscribed as the first black person to wear the wings of a U.S. Army aviator.

He earned that coveted badge and the accompanying distinction by successfully completing the Army's requirements for a Field Artillery Liaison Pilot-Observer: a 10-week primary course at Pittsburg and 5 weeks of advanced instruction at the Department of Air Training, Ft. Sill, OK.

Major Brown, who held that rank when he retired from the Army in 1965, said recently: "I knew back then that I was in a position where I had to make it. Some of the others in my class might kid around, but everything was deadly serious to me."

He admitted, however, that he was not concerned with setting a precedent when he volunteered for flight training. He was just taking advantage of an opportunity to be a pilot, something he had dreamed about since he was a child.

A native of Washington, DC, he was drafted in March 1941 after being graduated from Lincoln University, PA. He served as an enlisted man for about 15 months and was then chosen to attend the Field Artillery Officer Candidate School at Ft. Sill, receiving his lieutenant's commission from there in October 1942. When he was selected for flight school, he was serving with the 92nd Infantry Division Artillery at Camp Joseph T. Robinson, AK.

Racial equality had not been a part of his life up to that point, Major Brown said, not even in his military career. He was a Negro, and being an officer in the U.S. Army did not automatically buy equal treatment for him. That changed, through, when he started in aviation.

"It was a strange thing," he recalled. "In pilot training, it didn't matter what color I was because we were all treated alike. My instructors congratulated me when I did well and gave me a pink slip if I did poorly. I received two of those in the basic portion, by the way, and one more would have meant that I washed out. But my IP (instructor pilot) cared about me, and he gave me the extra help I needed to work out my problems with traffic patterns.

"I think the reason for that equality was because pilots are a different breed of men. They wanted to see anyone who had the guts to try it learn to fly; and I

had everybody, especially the instructors, on my side."

The new aviator's first assignment was with the 351st Field Artillery at Camp Livingston, LA; and when he reported in, his commanding officer told him there was a new L-4 Grasshopper airplane for him to fly. That was the kind of plane he had flown in training, with one big difference—those had been assembled and this one was still in the crate.

Since there was not an aircraft mechanic at Livingston, one came from the vehicle motorpool to help put on the plane's wings, tail and landing gear, and then spin the prop for Lieutenant Brown to take off on the first flight.

"I got up to about 3,000 feet," he said, "and I was having a ball, just singing and thinking what a wonderful job I had done. Then the engine quit. I was still over the field, so I executed the forced landing procedures I had been taught and came down without any damage. You know what the problem was?—We had left a bag of silica gel in the air scoop at the front of the engine! I promised myself then that if I ever had to do that kind of work again, I would be more careful."

And the intrepid assembler/test pilot/aviator did have to put another plane together, but that was several years later and on the other side of the world.

In the summer of 1944 the 351st was alerted for movement to Europe and subsequently was sent to England and then across the channel en route to Germany.

Even today Major Brown remembers with pride the service given by the men of that black artillery unit. "The gunners in our outfit were fast and accurate, better than most. The crew on any of the 12 guns could put three rounds in the air at the same time, and you could see all of them hanging up there—zap, zap, zap!"

Other memories he has of his duty with the 351st, however, are not so pleasant.

He explained that the enlisted men were "fuming and fussing" about the discrimination practiced by the battalion's white officers. Lieutenant Brown and two other Negro second lieutenants, in order to avoid what was getting to be a very bad situation, requested an investigation by their corps headquarters. One was made and some corrective action was taken. Included in that was the promotion to first lieutenant of the black second lieutenants, all of whom had been in that rank for about 3 years.

Major Brown summarized the tenor of those times for the black Soldiers when he said, "We were fighting two battles."

In April 1946 he returned to the United States and to civilian life as a schoolteacher in Washington. He was a member of the Army Reserves until August 1948 when he was recalled to active duty as an aviator with the 74th Combat Engineer Battalion at Ft. Campbell, KY. That unit went to Korea in September 1950.

His second experience with assembling an aircraft, this time an L-16, occurred in Korea; and it was "even more fantastic" than the one in Louisiana, he said. That was because he had to move the crated plane from Pusan, where it had been brought by ship, to the base about 50 miles away. Using a two-and-one-half-ton truck and a truck-mounted crane, together with some engineering ingenuity, the move was successfully made.

"When we reached base and got the thing uncrated, our problems had just started because the landing gear was cracked and needed to be welded. I had an aircraft mechanic assigned to work with me this time, and we figured out a way to keep the plane's fabric around the damaged area wet so it would not catch on fire while he was welding the break. That guy did a perfect job, too."

Major Brown laughed as he remembered that he later received an L-19 Bird Dog and did not have to assemble or work on it before he could fly it.

In Korea, the 74th was responsible for the improvement of the entire road network out in front of the 9th Corps, Major Brown said, so most of the missions he flew were reconnaissance flights over that area. For that service he was awarded the Air Medal with four Oak Leaf Clusters. He also was recommended for the Distinguished Flying Cross, and he talked about that:

"On November 20, 1950, a battalion staff officer wanted to make a flight behind the enemy lines to reconnoiter the roads, an area which was filled with North Korean ground forces.

A Log of Achievements

"We flew back and forth over that area for more than an hour; and when he said it was time to go home, we were 25 miles into enemy territory. On the return trip, I decided to fly with a ridge on my right to sort of protect me from the enemy fire; and over on the other side were our people, whom I hoped would recognize me and pay attention to the markings on our plane.

"As I was flying down the river valley, I looked ahead and the air was filled with tracers. One of our tanks was firing at the ridge top, and the North Koreans up there were firing down at the tank; and there we were in the middle in our little L-16 fabric-covered plane.

"I pulled back the throttle, pushed the stick forward and went down to the deck, straight down into the stuff and then turned into the side of the mountain so they couldn't shoot down on me. Well, we made it back; and the officer put me in for the Distinguished Flying Cross. But the commanding officer would not sign it. He said I had too many medals already for a black man, more than anyone else; so I never did get the DFC. I understand, however, that someone in Department of the Army is checking on it now."

In 1980, Major Brown said the hurt over the medal incident has lessened some but that it will never go away entirely. His willingness to risk his life, he declared, should be more important than the color of his skin.

Again with the 74th as with the 351st in Germany, Major Brown complimented the work done by the battalion's men:

"They were up on the side of the mountain, cutting a road out where it looked to be impossible. It was fantastic to fly over and see the way those guys handled their equipment on that steep surface."

His feelings about the ground troops could be said to have anticipated the motto, "Above the Best," which was adopted sometime later for the Army Aviation School at Ft. Rucker, AL.

Another segment of Major Brown's life started in 1952, when he was released from active duty and again became an Army Reservist. He served in that capacity until 1965. At the time of his final retirement from the military, Major Brown was commanding officer of the USAR 327th Helicopter Transportation Company, Ft. George G. Meade, MD.

In his 25-year Army career, he flew more than 6,900 hours, including 800 hours of combat time. To the wings he earned in 1943 has been added the wreath of a Master Army Aviator.

"I have no complaints. I think I achieved as much as my counterparts because I believed I was as good as the next fellow, and I worked to prove it. That attitude earned me the respect of most of the people I have been associated with, too."

From 1952 to 1962, Major Brown was a science teacher and the assistant director of adult education in the public schools of Washington, DC. During that period, he earned his master's degree from New York University.

He later served in the city government of Washington, working in various high-level positions until he retired in 1975.

The 62-year-old Brown, now a resident of Silver Spring, MD. was asked for his advice with regard to young men and women of his race entering Army Aviation today.

He said: "I have been out of it for 15 years, and I can only go on what I see and what I have been told. Based on that data, it seems to me the opportunities are wide open.

"I know being an Army aviator was a good thing for me, even with the difficulties I encountered. And so much progress has been made until it would be difficult to compare those days with today.

"I think the first thing I would tell a young black person today is not to come in with the attitude that you are going to be discriminated against or persecuted. Come in with the postive attitude that you are worthy of respect, and then earn that respect from others by preparing yourself the very best you can. You will be accepted if you prepare yourself for acceptance and responsibility."

Major Brown concluded with the observation that the continued improvement of relations between all Americans requires everybody's efforts, and he said he knew Army aviators would continue to lead the way toward that improvement.

Officer Personnel Management System

OPMS CORNER

Update On Aviation Career Incentive Pay

Major Jeremiah O'Fihelly

Aviation Plans/Programs
Officer Personnel Management Directorate
U.S. Army Military Personnel Center

THE FLIGHT SURGEON grounded me, but I don't feel sick, and I don't wanna lose my flight pay. Maybe I'll try another flight surgeon."

"That's nothing. The flight surgeon *cleared* me months ago. Yesterday the boss called me in and handed me a DA order that grounded me and stopped my flight pay 2 months ago. Finance says they're gonna take back the flight pay even though I already flew 18 hours this month. Something's wrong with the system. I mean, can they do that?"

Confusion. Frustration. Anger. And a couple of misconceptions frequently conveyed to Military Personnel Center (MILPERCEN) by telephone or letter questioning personnel actions affecting aviation service and entitlement to Aviation Career Incentive Pay (ACIP). Please consider the following:

- Flight surgeons don't ground aviators; commanders at appropriate levels consider recommendations of medical authority and restrict, suspend or restore aviators per AR 40-501 and AR 600-107.
- ACIP paid to rated officers is not really "flight pay" and should not be confused with hazardous duty incentive pay earned by nonrated crewmembers and noncrewmembers.
- Entitlement to ACIP usually terminates on the first day of the sixth month following the date of medical incapacitation.
- All aviators not suspended by Headquarters, Department of the Army must pass an annual class 2 flight physical examination approved by the U.S. Army Aeromedical Center at Ft. Rucker, AL.
- Final medical determination by the Aeromedical Center may differ from the medical opinion of the local flight surgeon and result in suspension, rather than an anticipated waiver.
- MILPERCEN takes final action on aviation service, to include indefinite suspension, waivers and restorations.

Back in the "good old days" management of flight pay was decentralized and simple—for the finance officer. Everybody maintained a current flight physical because everybody flew or lost pay. The local flight surgeon was pretty much the final medical authority with only the most "sticky" cases referred to the Surgeon General for resolution. For the aviator, especially those in "Category B" nonaviation assignments, the "good old days" meant scurrying around for flight time. A "CAT B" aviator might drive for miles on nights, Sundays or holidays only to find the scarce aircraft "red-xed" or over scheduled. But *no fly* meant *no pay*.

After Vietnam Congress took a hard look at aviator training, use and compensation and enacted Public Law 93-294, the Aviation Career Incentive Act of 1974 to be implemented uniformly by all services in the Department of Defense (DOD). Rated officers, i.e., aviators and flight surgeons, receive ACIP on a continuous or monthly basis. Aviators maintain *continuous* entitlement to ACIP by remaining physically qualified, whether or not assigned to operational flying duties, and meeting the prescribed 12- and 18-year gates. Pay earned is not hazardous duty pay and, although incidental to flying duty, is not directly related to hours flown. Conversely, flight performed erroneously while disqualified for aviation service will not result in more than the 5 months' pay authorized by the DOD Pay and Entitlements Manual (DODPM), computed from date of medical incapacitation.

Those aviators who have missed gates and all flight surgeons earn ACIP on a *monthly* basis only while assigned to operational flying and flight surgeon positions respectively. *Monthly* entitlement *is* related to flight in that the DODPM requires a minimum of 4 hours per month for pay regardless of any other aircrew training manual or regulatory flight requirements.

The most important consideration for entitlement to ACIP is physical qualification for aviation service. All aviators must be aware of their personal responsibility to maintain physical qualification under current regulations, for a number of reasons.

First, as mentioned above, all aviators, *regardless of duties,* must take and pass an annual flight physical examination, which is valid only when approved by the Aeromedical Center. Although this is difficult for aviators assigned to nonoperational duties, or at stations with no flight surgeon, routine class 2 flight physicals may be accomplished by any medical officer and forwarded to Ft. Rucker for review.

Second, occasionally an aviator must seek medical attention from a civilian doctor or medical officer who may not be knowledgeable in the specialty of aviation medicine. AR 40-8 requires that medical treatment of all aircrewmembers be under the supervision of a flight surgeon and that aircrewmembers tell their flight surgeon when they have received treatment following which flying restriction may be appropriate.

Third, final medical determination of every aviator's physical status is made by the Aeromedical Center; "shopping around for another opinion" will not usually affect the final diagnosis. In some instances a local flight surgeon may grant a medical clearance, expecting a waiver, only to have the aviator subsequently considered medically disqualified by the Aeromedical Center, with recommendation to the commander, MILPERCEN for indefinite suspension.

For aviators indefinitely suspended for medical disqualification, the DODPM authorizes up to 5 months' additional ACIP, computed from the date of medical incapacitation. In a "worst case" situation, a nonoperational aviator could erroneously wait up to 11 months for his or her next flight physical to report treatment by a nonflight surgeon. Further delay can occur in obtaining diagnostic consultations or medical workups necessary for the Aeromedical Center to arrive at a final medical determination. Regardless, the date of medical incapacitation, not the date of eventual discovery of an unreported grounding condition, determines the date of indefinite suspension and termination of ACIP.

Unlike the "good old days" the aviation program is more difficult to administer. Individual aviators must be as familiar with AR 600-107, 40-8 and 40-501 pertaining to their own responsibilities as they are with AR 95-1. It is very likely that centralized review of each aviator's physical status by the Aeromedical Center has contributed significantly to enhance aviation safety in recent years. Perhaps this article will provide a better understanding of individual responsibility to qualify for aviation service and ACIP, and the system by which the aviation program is administered. Further information can be obtained from the Aviation Plans/Programs Branch, MILPERCEN, at AUTOVON 221-0727/0794.

TASVAL Review

The Department of Defense joint service TASVAL test was the largest computer monitored DOD test ever conducted. TASVAL, the acronym for tactical aircraft effectiveness and survivability in close air support antiarmor operations, has been the subject of numerous general information articles in this and other publications. As the attack helicopter troop representing the Army during the test, C Troop, 7th Squadron (Attack Helicopter), 17th Cavalry, 6th Cavalry Brigade (Air Combat) from Ft. Hood, TX, had the unique opportunity to validate and innovate attack helicopter tactics under training conditions closely resembling actual combat. This article concentrates on the attack team (3×5) mix lessons learned

Major Kenneth R. McGinty
Captain Roth S. Schleck Jr.

Major McGinty was troop commander and Captain Schleck was executive officer of C Troop, 7th Squadron (Attack Helicopter), 17th Cavalry, 6th Cavalry Brigade (Air Combat), Ft. Hood, TX, when this article was written

Tests, A Means To Train And Learn

THE TASVAL scenario we faced was a depiction of a premeditated enemy attack against a numerically inferior force. The makeup of the battle forces was:

- Red: 1 Tank Regiment (-); 1 ADA Battalion; 1 Artillery Battalion; and 1 Electronic Warfare Battalion (-).
- Blue: 1 Tank Company (-); 1 Attack Helicopter Troop.

These forces were deployed and engaged each other in areas ranging from 3 to 4 km wide to 6 to 7 km long. The force distribution and positions did conform to available intelligence data.

Each iteration began with a short reconnaissance period. During this time the attack team's scouts were allowed to move forward to confirm preplanned firing positions and adjust artillery fires on enemy forces. The reconnaissance period ended with the Red forces crossing the LD. From this point until "stop trial" (trial duration was a maximum of 45 minutes) the battle was a relatively free-

Glossary

ADA	air defense artillery	FM	frequency modulated
ADCFB	Air Defense Command, Ft. Bliss, TX	km	kilometer
AH	attack helicopter	LD	line of departure
CDEC	Combat Developments Experimentation Command	NOE	nap-of-the-earth
COMJAM	communications jamming	TASVAL	tactical aircraft effectiveness and survivability in close air support antiarmor operations
DOD	Department of Defense		
EIR	equipment improvement recommendation	TOW	tube-launched, optically-tracked, wire-guided
ESC	Experimentation Support Command	TSU	telescopic sight unit

AH-1 in firing position

As the fast-moving threat force became accustomed to working against attack helicopters, it forced the attack helicopter troop to improve its techniques and teamwork

play exercise inside established boundaries.

As part of the "Blue," or friendly force, C Troop operated as a maneuver element in support of a tank company (Armor Company, ESC, CDEC) delaying in front of the massive onslaught of a Red force. Red forces consisted of a tank battalion (represented by 4/40th Armor, 4th Infantry Division) supported by a large number of ADA weapons to include ZSU-23-4s, SA-7s, 8s and 9s (provided by 5/57th ADA, USA ADCFB).

The Red force simulated threat tactics which provided the ideal scenario to test our tactics and techniques. Aircrews took an intense interest in the operations which not only provided an accelerated learning curve but also resulted in numerous valuable suggestions for EIRs. Perhaps the most valuable tool was the immediate feedback the special onboard instrumentation provided the pilots.

A tank, when hit by a simulated TOW missile would stop and "pop" purple smoke—a clear indication to the aircrew of a kill. Special radar warning devices, the APR-39 and -44, made crews acutely aware of the intense enemy ADA threat on the battlefield and forced them to consider all avenues to preclude acquisition from the ADA threat.

Sophisticated jamming equipment made it impossible to conduct normal radio conversations and forced the attack helicopter team to use hand and arm signals, and other alternate means of communication. The next best thing to a real TOW's impact, gun camera films were reviewed after the battle to show crews the results of their shots. The film allowed gunners to perfect their missile gunnery and develop sophisticated techniques to ensure acquisition and improve probability of missile strike on every engagement.

The unit identified consistently successful tactics and techniques as well as highlighted unsuccessful ones. The following paragraphs detail important lessons learned which affect the attack helicopter team. Confirmation of these observations will be forthcoming after the Army's independent analysis agencies complete their thorough research.

- The speed of an attacking force can be overwhelming in a situation when relatively unopposed or facing an inferior (by numbers) force. In TASVAL it was necessary to use some tactical control measures to effectively deal with a fast moving threat.

✓ *Check Points.* Use of check points allowed the scouts and attack team leader to move AHs around the battle area swiftly and without confusion or long radio transmissions.

✓ *Target Engagement Areas/Kill Zones.* These areas were designated along expected avenues of approach and anticipated areas of enemy congestion. Both air and ground commanders could use these measures to control distribution of fire. In TASVAL these areas generally were 1,500 by 800 meters in size and conformed to the terrain and intervisibility of the friendly forces.

✓ *Firing Positions.* Different firing positions must be selected to engage targets in each kill zone. These positions as described by doctrine were confirmed in TASVAL. However, there are constraints and qualities which are either overstressed or not addressed. A good preplanned firing position should meet several qualifications. It should provide for a 3,000 meter standoff, to avoid front line ADA engagements, achieve flank or oblique engagements to preclude visual acquisition and provide maximum kill capability, and attempt to remain masked from second or follow-on echelons. It should be noted that all of the above measures can be easily preplanned by map study and time permitting confirmed by the scouts on the actual terrain.

- Both air and ground commanders must have a mutual understanding of each others' tactics. Mutual understanding is necessary to preclude confusion and aids in maximum use of combined assets. Most ground commanders have little idea of how to properly use attack helicopter assets to their best advantage. Close liaison should be effected with the supported unit to ensure that that commander has the most expert advice regarding AH capabilities. Only then will the ground unit commander be able to properly plan for the battle.

Next to planning the battle, the most important plan is the coordination of fires. A map reconnaissance will help determine which areas are dead spots for either air or ground weapons, e.g., woods for the AH team, so that the other type weapons system can be assigned to cover them. Agreement should be made at what point the aeroscouts will hand off artillery adjustment to the ground unit. The ground commander also should understand that the AH will attempt to decimate the enemy first echelon so it is significantly attrited by the time it is within direct fire range from the ground force. At that point it is advantageous for

Proper use of attack helicopter assets

Tests, A Means To Train And Learn

the AH to shift its fires to the second echelon.

• The fast moving threat force, especially after it became accustomed to working against attack helicopters, forced us to really improve on our AH techniques and teamwork within the 3×5 mix, and do a few things differently than had been previously accomplished.

✓ Routes into the areas had to be carefully selected to avoid visual and radar acquisition before the AH team strike. Even though the ADA knew we were coming, we managed to stay in ground clutter and remain undetected by choosing sound NOE routes and keeping masking terrain between ourselves and the force until they reached the kill zones.

✓ Rapid determination of the enemy's flank is of paramount importance in allowing the AH team to strike in its most advantageous manner, from the flank or oblique.

✓ In the rapidly moving battle the AH-1 Cobras cannot wait for the scouts to place them in exact positions. Instead, each section scout must move his team to a general area (battle positions) and then the AH team leader directs the exact successive firing positions as the enemy closes range. This is the only way that the AH can keep up with the battle and maintain standoff distance. It becomes incumbent upon the team leaders of both the heavy and light teams to stay abreast of the battle situation and to make the decision on when the teams should move and where. Team integrity should be maintained at all times.

• We attempted to strike with the first missile at TOW maximum range (3,750 meters) and then maintain throughout the battle a 3,000 meter "standoff" range. This strategy kept us out of the effective range of the majority of enemy ADA systems and made us difficult to detect. However it soon became apparent that the TOW missile was too slow. During each launch the helicopter was exposed a considerable amount of time, making it much easier for the enemy to find us. Given this situation we made the following discoveries:

✓ Crews had to ensure at these distances that *acquisition* time was less than 10 seconds and if no target was discovered in that time period, they should remask. It is our opinion that reduced unmask time is directly proportional to aircraft survivability. In a target rich environment the number of missiles which can be launched from the firing position depends upon the quality of the position and its security. These factors determine how many missiles can be launched without relocating. To dogmatically insist that the AH must move after every launch will degrade the effectiveness of the AH team, will not allow for multiple engagements and will permit the enemy to attack at a faster rate.

✓ The slowness of the (TOW) missile made it difficult to ensure a constant line of sight from launch to impact. Crews had to make an immediate decision and decide if they could, with a high degree of probability, track the missile to impact. *Missile tracking training is extremely important.* Gunners must be trained to know nominal ranges and missile flight times. They must make a quick determination of target speed and terrain by use of their peripheral vision, and they must make a quick determination of target speed and terrain at impact. After launch, they must assist pilots to move the AHs to the best masked position obtainable within the firing position to avoid acquisition while continuing to track the missile to impact. Gun camera film equipment used in a comprehensive training program provides this training.

✓ Crew training and coordination are critical in order to minimize exposure time. Switchology (crew interaction) standardization is a key to survival. The crew must be a totally coordinated team during unmasking, acquisition, missile launch to impact, wire cut and movement of the helicopter with a missile on the wire.

✓ At this juncture the only aids to determine in-range targets are the WORM formula (see "The TASVAL Experience," March 1980 ***Aviation Digest***) and use of the sight markings within the TSU. However, because aspect angles are difficult to determine at maximum ranges, this makes the WORM formula highly technical and inexperienced crews must refer to a map to determine maximum distances to preclude out of range launches. A rangefinder would decrease the exposure time of an AH and allow for fewer out of range engagements.

✓ At maximum ranges crews had to ensure masking from second echelon threat ADA while engaging front-line forces with steel upon steel.

✓ The requirement to become an expert at target recognition, map

Moving into battle position

reading and range determination is a must for all crews. High proficiency levels in these skills determine the level of success of the AH team.

✓Painting rotor hubs and masts black reduced optic and heat seeking missile acquisition.

• The TASVAL enemy used extensive jamming capabilities on all frequencies; however, the COMJAM had a minor effect. We used brevity in all transmissions; we transmitted while terrain masked; and we used hand and arm signals to their maximum extent. Only when jamming became intolerable did we change frequencies. COMJAM is a most critical concern. However, *good briefings,* terrain planning and use of *preplanned tactical control procedures,* along with standard brevity codes, greatly reduce its effectiveness. To further facilitate the flow of information, the entire AH team should monitor the ground commander's FM frequency. By doing so the team is apprised continually of both blue and red force situations. The team can monitor scout spot reports, thereby reducing radio traffic because the scout does not have to relay the information again on the AH separate frequency.

• The scout proved again to be an indispensable asset. Although the scout's contributions generally are intangible, as far as computer analytical data is concerned, we found that the myriad tasks the scout must perform are critical to the success of the attack element.

✓The AH team leader must, when time permits, meet "face to face" with the ground commander. They meet to ensure that the AH team has the latest information, and in turn to provide the ground commander with the AH team's graphic control measures.

✓ They must adhere to those tactical control measures mentioned above.

✓ The scout should hand off groups of targets to the AH. Single target hand-off should only be attempted in the offensive role or when a single threat system is preventing or hampering the AH team actions. By handing off arrays it allows the AH to attrite the enemy early and at maximum range without delay. This concept will allow for multiple kills while the enemy is in the open or slowed down.

✓ The scout must provide rear and flank security for the AH team. The AH team cannot be concerned with its immediate security. Instead, it must concentrate on surveillance and radar security from the attacking force while providing maximum steel on steel downrange.

✓When possible the scout should be allowed by the ground commander to adjust long-range artillery. As proven during TASVAL, the scouts can find the enemy well forward of the capability of the ground forward observer. In addition, the observation helicopter's small size makes it very difficult to detect.

✓ The scout is an effective decoy against a heavy ADA threat. Since the scout does not have to remain unmasked to acquire a target and track a missile to impact, it can provide a "radar ruse" and draw the attention away from the AH—thus allowing them freedom of maneuver to attack.

✓ The scout *must* have optics compatible to that of the AH in order to distinguish targets early without having to press in too close and forfeit the team's element of surprise.

✓The flat plate canopy is a much needed modification to the scout helicopter. Glint always has been a detection problem with the OH-58 Kiowa. Although initially unpopular, the flat plate canopy is a *must.* It was quite effective in TASVAL because it cut down glint of the OH-58C and did not telegraph scout positions.

TASVAL, in addition to being a test to check the survivability and effectiveness of close air support assets, was additionally a formidable challenge to the training tactics, procedures and equipment of the attack helicopter units. In the end, when the 7 months of data of the more than 100 trials that were run is analyzed, we feel sure that it will be clear that the AH team is a highly mobile and most capable threat to the armored attack. When properly employed, it can disrupt and confuse an enemy force well forward of friendly ground forces—thereby turning a large threat force into a disorganized mass of steel which can be quickly destroyed.

Previous articles on TASVAL published in the *Aviation Digest:*
- **"TASVAL," page 16, September 1979**
- **"The TASVAL Experience," page 39, March 1980**

Training and coordination to minimize exposure time

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

If you have a question about personal equipment or rescue/survival gear, write PEARL, DARCOM, ATTN: DRCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120

Ku-Dos Are In Order

Eighth U.S. Army has established aviation life support equipment (ALSE) maintenance and procedure courses for all aviation units in Korea. One course was conducted at the Yongsan Officer's Club 18 to 21 March 1980; two were held at Pyong Taek 1 to 4 April; and one was convened at the 2d Infantry Division 15 to 18 April. Aviation unit commanders identified ALSE officers and noncommissioned officers to attend the courses. Unit aviation safety officers, aviation safety NCOs/specialists and KATUSA (Korean Augmentation to United States Army) personnel working in the ALSE program were encouraged to attend.

First U.S. Army held its annual Aviation Resource Management Conference 21 to 23 March 1980 at Ft. George G. Meade, MD. Representatives from the DARCOM Project Office (DRCPO-ALSE) participated and briefed attendees on all aspects of the ALSE system. A follow-up briefing and training session was conducted by Mr. John A. Chubway of this office for personnel of the Maryland Army National Guard at Aberdeen Proving Ground, MD.

Four ALSE "posters" have been prepared by the Army National Guard Multimedia Group, Ft. Rucker, AL and are available for distribution from DRCPO-ALSE. If you haven't been receiving yours, please let PEARL know.

We appreciate the support that this office is getting in telling the ALSE story and will keep you apprised of "What's Happening in ALSE."

Reruns

Recently we have been deluged with requests for a consolidation of all our past PEARL articles. This is understandable as many personnel now working in the ALSE field have only been doing so as of late and for a relatively short period of time. Consequently, we are compiling our PEARL articles into a single publication and will distribute this to the field when completed. In the meantime, however, we will start reprinting some of those articles from the past which we consider still current and of importance to ALSE personnel in the field. To avoid confusing these "reruns" with new articles we will indicate at the end of each article that it is a reprint and the issue from which it is reprinted. The article which follows is such an example:

SRU-21/P Survival Vest Holster

We have had a few cases where people failed to sew the holster on their SRU-21/P survival vest and consequently cannot locate the sew-on holster. In the November 1974 ***Aviation Digest*** *you listed a breakdown of the SRU-21/P, but listed the sew-on holster as a part of the vest itself. Can you provide an NSN and a supply reference for the sew-on holster?*

The holster which is supplied with the SRU-21/P survival vest is furnished by the contractor and has no separate NSN. The holster is not available through normal supply channels. It appears the only recourse for a loss of this item is to purchase another vest, without components, NSN 8415-00-177-4818. (Reprinted from PEARL, March 1976.)

More Adhesives

In last month's PEARL we gave you the NSN for the correct adhesive to use for installing a new liner in the SPH-4 helmet. In addition, the following information is provided.

When repairing certain components of the SPH-4 flyer's helmet it is imperative to use the proper adhesive. Failure to do so will result in damage to the helmet as well as a potential safety hazard. Do not attempt to use an adhesive for an application other than that which it is intended or substitute one adhesive for another. Repair of the following components should be accomplished only with the proper corresponding

Kim Aguilera

Photo by Tom Greene

PEARL'S

adhesive. This information is reiterated in TM 10-8415-206-13.

Component	Adhesive Used in Repair
Helmet Liner	Synthetic Adhesive, NSN 8040-00-753-4800
Rubber Beading	Synthetic Rubber Adhesive, NSN 8040-00-832-6173
Earcup Cushion Inserts	Adhesive, NSN 8040-01-023-4173 and NSN 8040-01-023-4172

Spot test an application of adhesive on a small area to be repaired for 10 to 15 seconds before applying the adhesive to a larger area. If the wrong adhesive has been applied to the surface, the deteriorating effects will be visible within this time.

Requests for additional information may be addressed to Commander, U.S. Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MFT(1), 4300 Goodfellow Blvd., St. Louis, MO 63120. Point of contact is Marie Kilz, AUTOVON 693-2614.

Survival Vest Problem

A recent operational hazard report (OHR) was submitted by one of our aviators and we would appreciate mentioning this problem in PEARL as it may save a life and prevent a crash situation. The aviator reported, *"While hovering with a 25 mph tailwind with the aircrew and two passengers aboard, I ran out of aft cyclic with the survival radio in the bottom right pocket of the survival vest. I would recommend moving the survival radio to the center left side."* (Thanks to CW3 Warren Wandel, Headquarters Fifth U.S. Army, for this information.)

We appreciate all OHRs and their very purpose is to solve problems and provide our aircrews/passengers with a safe operational environment. We are making all aviation units aware of the problem and support relocation of the survival radio. This item is provided to give you the chance for survival in an emergency and if the positioning on the vest creates a hazard, then by all means have it relocated.

Questions and Answers

According to a previous PEARL article (July 1979), those of us in OV-1 Mohawk units having the rigid seat survival kit (RSSK) were advised to remove the zinc chromate coating on the kit frying pan to prevent possible food contamination if used in a survival situation. We have tried just about everything, including the most powerful solvents at our disposal, to remove this coating but have been completely unsuccessful. Is this coating really zinc chromate or is it another type of coating, such as Teflon? (SSG Joe Darvill, AASF #1, GAARNG, Winder, GA)

If you cannot remove the coating on your frying pans with relative ease using normal solvents, you may assume that the coating on these items is something other than zinc chromate. Information received from NARADCOM indicates that the pan, NSN 7330-00-213-7173 (as listed in SC 1680-99-CL-A08, -A09 and -A10), for the RSSK now has a Teflon coating, which can be removed only with great perseverance or by something closely akin to a small nuclear explosion. The new pan is a vast improvement over the old pan, incidently, and the price of the item shows it—$31.91 for the new one as opposed to $1.90 for the old one. So, if your pans do have a Teflon coating, please don't try to remove it.

Several of our units, and I am sure many other Armywide, have a definite requirement for a seven-person life raft. One unit attempted to order the LRU-1/P raft, NSN 4220-00-071-1889, as listed in the consolidation of ALSE items published by your office, but has been unable to get this item. Is the LRU-1/P raft available, and, if so, how can it be obtained? (CW3 Dave Klindt, U.S. Army Safety and Standardization Board, USAREUR)

Field testing on the LRU-1/P raft has been completed, the item has gone out on production contract and it is available in limited quantities to personnel in the field. Although an Air Force item of equipment, the LRU-1/P raft should soon be entered in the Army Master Data File, since the Army has already been identified as a user of this item. This raft can be ordered under the above mentioned NSN, source of supply B17, cost $611.80 each. Keep in mind, however, that it is an Air Force item and that some time delay may be encountered between ordering and receiving it. For further information, contact Mr. George Stief, U.S. Army Troop Support and Aviation Materiel Readiness Command, AUTOVON 693-2377.

THREAT

Major Frank E. Babiasz
Threat Branch
Directorate of Combat Developments
Fort Rucker, AL

CHEMICAL WARFARE

IN 1925, THE Soviets signed the Geneva Protocol prohibiting chemical warfare. Then in 1975, they endorsed the Biological Weapons Convention prohibiting the production, stockpiling and weaponization of biological agents and toxins. However, numerous unconfirmed sources have indicated that Soviet forces are presently using nerve agents against Afghan patriots in an effort to flush them out from hiding. Historically, the Soviets' association with chemical warfare (CW) stems from mass casualties suffered in World War I; however, chemical warfare can be traced back to as early as 200 B.C. when Marcus Fulvius used irritants and poisonous smokes.

CW, employed in mass, did not become a world problem until Germany staged its first chemical attack on the Russians in 1915. As Germany was the undisputed leader in the chemical industry, it should not have been a surprise that they would be first to use toxic chemicals on a large scale. Although highly toxic chemicals were later developed, they were initially used as incapacitants.

In World War I, for example, there were 1,287,000 casualties from CW agents. The Soviet Union alone suffered 475,000 of these, or 37 percent of the total. These are truly staggering figures; yet, as often happens with time, we lose sight of what history has taught us.

Although chemical agents were not used in World War II, research and development still continued at an astonishing rate. The Soviet Union recognized the need for a military chemical service capability and aggressively upgraded their chemical service forces. Additionally, G-type nerve agents were developed and produced by the Germans during World War II. Consequently, large stockpiles of chemical munitions were captured and transported to Russia after the German collapse.

Today, the Soviets are considered to be better prepared and more extensively equipped for chemical warfare than any other nation in the world. To understand the overall chemical threat it is necessary to outline Soviet policy, doctrine and strategy. Soviet military doctrine is one of total offense—speed, mobility, surprise and massive firepower are stressed. Basically, their strategy calls for rapidly engaging the enemy, effecting a thrust into the enemy's rear area, bypassing pockets of resistance and built-up areas, and encircling the enemy's forward positions. The Soviet *policy* on chemical warfare is less than clear; however, the initial decision for the use of chemicals will be made at the Politburo level. Once the decision has been made, the army or *front* commander would determine their subsequent and continued use. According to the Soviets, the purpose of nuclear/chemical weapons is to eliminate an adversary's nuclear delivery systems, *airfields,* and command and control centers. The obvious advantage of chemical agents over nuclear weapons is the limited blast damage. Additionally, Soviet tactical training indicates that nonpersistent CW agents would be liberally employed prior to actual combat engagement and at the forward edge of the battle area, while persistent CW agents would be used deep in the rear and along troop flanks.

Soviet CW Offensive Capability. Although accurate and detailed information on Soviet CW offensive capabilities is limited, authoritative writers generally agree that a massive capability exists. In the early 1960s, Admiral Coggins, former Chief of U.S. Naval Atomic, Biological and Chemical Warfare, made the following statements regarding Soviet chemical production capabilities:

"A few years ago, they (the Soviet Union) had 106 chemical plants in operation, of which one-half were either producing or were capable of producing, the latest war gases. His (Soviet) stocks greatly exceed the combined stocks of the free world, being quite sufficient for three to four major offensives on a wide front. His present stockpile is reported as enormous, comprising fully 15 percent of the total of the Russian military munitions."

Speculation aside, it is difficult to believe the Soviets would not use chemical warfare considering:

- The amount of chemical munitions in the Soviet inventory.
- The large number of chemical production facilities.
- The ability to deliver chemicals in large quantities with present day systems.
- Most importantly, the equipment and training which provide the ability

to conduct extensive offensive operations in a chemical environment.

It is reported that chemical rounds exist for mortars; 122 millimeter (mm), 130 mm and 152 mm artillery; the BM-21 multiple rocket launcher and for free-rockets-over-ground (FROGs) and surface-to-surface missiles (SCUD). The figure below summarizes these weapons.

Soviet CW Defensive Capability. To complement the highly mobile offensive striking force, the Warsaw Pact countries have fielded the world's most complete inventory of CBR (chemical, biological and radiological) protection, identification, detection and decontamination equipment. For example, all Soviet armored personnel carriers are equipped with chemical agent filters coupled with an overpressure capability. In addition, the T-55 and T-62 tanks, although somewhat outdated by today's standards, are equipped with a system called PAZ, which automatically closes unprotected apertures when radiation or nuclear shockwaves are encountered. The system includes a centrifugal particulate air filter. Additionally, the T-64 and T-72 are thought to have an improved collective protection system and the developmental T-80 also will have upgraded systems. The Soviets' defensive chemical inventory covers a large spectrum; however, it is sufficient to say that their presently fielded systems are more than capable of operating in a chemical environment.

CW Training. Probably the most notable area of the Soviets' and Warsaw Pact countries' capabilities lies in CW training. Soviets first receive CBR training in grade school. There young students first learn to wear the protective mask with training progressing in the secondary schools to cover subjects such as the effects and delivery systems of NATO CW agents.

All personnel entering the military receive extensive NBC (nuclear, biological, chemical) training. Some sources indicate up to 15 percent of basic military training is devoted to NBC. Much of the training emphasizes wearing of the protective masks and clothing so that physical and psychological conditioning are developed. This will greatly aid in performing combat assignments for extended periods of time. One Czechoslovakian paper even described a chemical pentathalon in which one event was an 800 meter run with full protective clothing.

Besides individual protection extensive training is dedicated to the decontamination and detection of chemical agents. Decontamination training is given primarily to chemical troops and special units within the services, although tank crewmembers and other vehicle operators learn to use portable decontamination equipment. Additionally, these personnel also are assigned other functions such as chemical observation and CBR reconnaissance. Early CW detection also is emphasized through systematic and repetitive training.

Chemical Threat to Army Aviation. Should the Warsaw Pact decide to use chemical weapons in any future conflict, Army Aviation will undoubtedly have to operate in contaminated areas. Unfortunately, aviation faces numerous problems in dealing with combat operations in a chemical environment. Aviators will be vulnerable to chemical munitions both in flight and on the ground, i.e., forward arming and refueling points, laager areas, etc. In the forward area, well within range of organic artillery and multiple rocket launchers, aviators probably will be subject to nonpersistent agents because the delivery systems can establish high concentrations in relatively short periods of time. The major threat to aviators, however, is the continued presence of invisible, highly toxic clouds. Many target areas will be subjected to multiple employment of lethal nonpersistent agents; aviators operating in these areas are highly likely to encounter these clouds several times during routine flight operations.

In the rear area the primary threat to tactical aviation is posed by rockets, missiles, bombs and aerial dispensers, probably containing a blister agent or highly toxic, persistent nerve agents. Normally, a large ground area will become contaminated and, depending on the weather, could remain contaminated for days. The commander may then be forced to relocate or operate support facilities with personnel in protective garments. Also, aircraft caught on the ground will become contaminated and will remain so for long periods of time as present decontaminants are only minimally effective on aircraft materials.

One of the biggest problems facing the individual aviator in the chemical environment is the ability to function at normal capacity during *sustained operations.* Although we may be able to protect ourselves, the psychological/physiological problems associated with the wearing of protective clothing and masks during flight is critical and must be closely monitored by commanders. Although a sealed cockpit or overpressure system on future aircraft could help remedy this situation, there is always the problem of system malfunction. Additionally, crews would have to later exit the aircraft which may be contaminated and would still require protective clothing.

It is believed that the chemical threat is formidable and its use on the modern battlefield will not be restrained as many hope it will be. Chemicals may, in fact, be liberally employed in any future conflict. We must be prepared in all eventualities.

Reported CW-Agent Delivery Systems Organic to Soviet Ground Forces

Weapon	Max. Range	Weight of Projectile or Warhead	Unit Deploying	No. of Weapons in Unit
122 mm	12 km	25.8 kg	Regiment	6
130 mm	27 km	33.5 kg	Army	36
152 mm	17 km	43.6 kg	Division	18
BM-21	15 km	45.9 kg	Division	18
FROG-7	60 km	Est. 450 kg	Division	4
SCUD A	80 km	Est. 680 kg	Army	3
SCUD B	280 km	Est. 770-860 kg	Army	3

VIEWS FROM READERS

Editor:

I never expected to read anything out of the Army Safety Center belittling a program designed to enhance aviation safety. The letter (February 1980) reflecting on CW4 DeCurtis' article ("Maintenance Test Pilot Standardization," December 1979 ***Aviation Digest***) on the maintenance test pilot standardization program is the precedent setter. The statement that IP/SIP involvement in this program "could be looked upon as letting the fox in the hen house," *could* be compared to the meteorologist "always talking about the weather, but never doing anything about it," or the Army Safety Center "always talking about accidents, but never doing anything about them."

Those of us in the safety business, not distracted by computers, are constantly on the lookout for effective ways of preventing accidents. When we designed the MTP (maintenance test pilot) standardization program it was not intended as a cure-all, but another tool that might make the job safer for the guys at the controls. (Ever heard of a computer crashing?) We think Joe DeCurtis explained the program very well and brought out some interesting, thought-provoking questions. Thanks, Joe, and keep up the good work!

USAREUR does not share in the high incidence of IP/SIP related accidents. Our 1978 accident rate was 2.39 per 100,000 hours and the 1979 rate was 4.37 with *no* IP/SIP related mishaps. Incidentally, these are the lowest accident rates of any major Army command —ever.

We in the field who are first on the scene of the accident do not appreciate having cold water thrown on any program intended to enhance aviation safety.

LTC Sylvan D. Hoyem
President, USAREUR
Aviation Safety and
Standardization Board
APO New York 09025

Editor:

The story about the aviation life support equipment (ALSE) workshop, "The Greatest Show On Earth," ***Aviation Digest,*** April 1980, was excellent.

However, everybody knows the main support for a circus comes from the clowns! In this case the head "clown" is Ms. Susan Johnson, USAR-DAC, 88th USARCOM Aviation Support Facility, St. Paul, MN who put on the act to the students in explaining the supply side of the ALSE program. I feel this is worth mentioning because if we don't know how and where to get the equipment, we don't get it.

Please give Ms. Johnson credit for her hard work and efforts in this worthwhile program in your next issue. Thank you.

SFC Herbert L. Williams
Chief Enlisted Advisor
88th USARCOM
Aviation Support Facility
St. Paul, MN

***The Aviation Digest** thanks Mr. Philip Massie of Culver City, CA for the photographs above. At left is Mr. Massie during World War II with his L-4. The other photo shows the airstrip from which Mr. Massie was flying near the end of the war in Europe. It is located about 30 miles east of Linz, Austria—a mile from Russian troops, the most easterly element of the United States Army at that time. Mr. Massie recalls, "We had a good airstrip (for a change) and stayed in place as the 11th Armored Division pulled back to group up." He adds, "I flew the one Piper Cub from Trowbridge, England (where we assembled it) to Gemunden, Austria with only one bullet hole (and several close rounds)."*

For the past 2 years, the author served as Readiness Project Officer with the U.S. Army Troop Support and Aviation Materiel Readiness Command at St. Louis, MO where he managed worldwide logistic support for the Army's C-12 fleet. In this article he provides an overview of the C-12 logistical support concepts, associated costs, current readiness rates and efficiency of the civilian maintenance program. Army personnel should thoroughly understand this concept which has the potential for supporting other Army systems

LOGISTICAL SUPPORT OF THE C-12

Major Sidney H. Morrow
Air Command and Staff College
Maxwell Air Force Base, AL

EVERYONE HAS heard the statement that the military must accomplish more with less. Army Aviation is no exception because it faces problems in all phases of the life-cycle management of the fixed wing aircraft fleet. Materiel managers, logisticians, operators and other individuals working with Army Aviation face a number of major problems. Typical problems include replacement of an aging fixed wing aircraft fleet, increased flying hour costs, reductions in maintenance personnel and reduced funding. Despite these problems Army fixed wing mission requirements continue to increase annually.

As aging fixed wing aircraft are retired from Guard and Reserve units, the active Army provides replacement aircraft from existing assets. This action leads many top Army officials to consider various solutions to offset shortages in resources and still resolve many logistical problems related to aviation. Thus, after considerable debate, the Army decided to introduce a new off-the-shelf fixed wing aircraft into the active units. However, the introduction of a new aircraft carried a major stipulation that the winning contractor also must provide all logistical support. This new innovative concept appeared as one means of managing some of the problems facing Army Aviation. The logistical support concept centered around an assumption that contractor maintenance would yield a higher rate of readiness and would thus require fewer aircraft. Further, the Army estimated that a civilian contractor could maintain an off-the-shelf aircraft more economically than the Government could.

In 1973 a competitive fly off was completed and the Army selected Beech Aircraft Corporation's (BAC) Super King Air 200 as the new Army fixed wing utility aircraft. The Army designated this aircraft as the C-12 Huron. The C-12 is a twin engine turboprop aircraft with a pressurized cabin and a T-tail configuration. This 12,500-pound aircraft carries two crewmembers and eight passengers plus 300 pounds of baggage or a crew of two and 2,000 pounds of cargo. It flies higher (31,000 feet) and faster (258 knots) and has a greater payload capability (5,153 pounds useful load) than any other utility fixed wing aircraft in the Army.

Since the cost of C-12 aircraft could be predicted to increase each year, Army officials knew replacement on a one for one basis for the Army's aging fixed wing fleet was unlikely. Figure 1 depicts the total procurement cost for the C-12 fleet.

Under the C-12 logistical support concept the C-12 contractor provides total logistical support for all C-12 aircraft located around the world. (See figure 2 for a list of C-12 locations.) The contractor's responsibilities include all maintenance activities and related functions such as procuring, replacing and repairing all spare parts; maintaining engineering drawings and technical data; and, training pilots, instructor pilots and crewchiefs. Beech Aerospace Services, Inc. (BASI), subsidiary of BAC, is the organization responsible for the C-12 logistical support program.

A key factor addressed in the logistics program was a guarantee by BASI that it will maintain an operational ready (OR) rate of 80 percent for each C-12 at its beddown base location. On the basis of this guarantee, the Department of the Army (DA) adopted 80 percent as the C-12 readiness standard, not operationally ready supply (NORS) and not operationally ready maintenance (NORM) at 10 percent each. The program requires BASI to pay the Army for each hour that a C-12 fails to achieve the monthly 80 percent OR rate. The contractor, however, is not given a monetary reward for maintaining the C-12 above DA standards.

The contractor operates under the objective of maintaining the 80 percent OR rate. BASI maintenance philosophy is to support the C-12 maintenance program with capable personnel and maintain an effective communication and parts movement system. They employ certified airframe and powerplant mechanics

Figure 1 : PROCUREMENT COST

Fiscal Year	Number of C-12 Aircraft Procured	Cost Per Aircraft Including Modifications	Total Procurement Cost Including Modifications
1973	20*	$ 598,935	$11,978,700
1976	20*	684,992	13,699,841
1977	20*	799,741	15,994,830
1978	14*	871,376	12,199,264
1978	6**	1,085,675	6,514,051
		TOTAL	$60,386,686

*Utility fixed wing configuration
**Special Electronic Mission Aircraft (SEMA) configuration

and assign one technician to each C-12 at a specific bed-down base. Since the Army does not own the spare parts for the C-12, it does not interface with BASI in terms of ordering, shipping or receiving spare parts. To save time, BASI conducts traffic management studies, analyzes customs requirements, compares shipping costs and other related factors to develop a tailored package of high usage spare parts at each bed-down facility. This action enables BASI to reduce logistic support cost and reduce NORS, thus improving the OR rate.

To prevent the grounding of a C-12 because a specific part is not in local stock, BASI technicians follow the parts replenishment matrix as stated in figure 3. When parts are required, a technician can relay requirements to BASI and they will move the part by commercial carriers anywhere in the world. But, if the headquarters office determines that the needed part can be obtained more quickly from a local vendor or another bed-down base, it will direct the technician to obtain the needed part from the most convenient source. If special technical skills are required to handle a specific maintenance problem, highly trained BASI factory technicians report to the bed-down base with parts and test equipment.

Both contractor and Army personnel maintain required maintenance forms and records in accordance with Army maintenance manuals and procedures. However, Army personnel must maintain the Army Inventory Status and Flying Time Report (DA Form 1352). The Army uses this form to report the OR rate. Determination of the OR status rests with the Army's contracting officer's representative (COR), who monitors the BASI technician to ensure the required maintenance functions are accomplished and declares when the C-12 is operationally ready. The net result of this team effort is a logistic program that is working for the betterment of Army Aviation.

The Army receives many additional benefits from the logistical support concept. The benefits include a reduction of procurement expense, maintenance, spare parts inventory, depot storage and other support facility costs. However, the Army's primary benefits are personnel savings and a higher aircraft readiness rate. By using a civilian contractor the Army was able to use C-12 military personnel allocations for other purposes. Due to the higher OR rates and fewer NORS/NORM problems, the C-12 can be used for more missions.

The Army judges the success of a specific aircraft fleet by comparing the achieved OR rate against the established Army standard. By noting the achieved OR rate, as indicated in figure 4, and noting the number of aircraft and comparing programed flight hours versus flight hours obtained, as indicated in figure

Figure 2

C-12 AIRCRAFT LOCATIONS

Quantity of Aircraft	Bed-Down Bases
4	Dhaharan, Saudi Arabia
2	Riyadh, Saudi Arabia
2	Izmir, Turkey
1	Sinop, Turkey
8	Heidelberg, Germany
1	Hanau, Germany
4	Stuttgart, Germany
1	Mannheim, Germany
1	Athens, Greece
2	Fort Rucker, Alabama
1	Leghorn, Italy
2	Vincenza, Italy
2	Glenview Naval Air Station, Illinois
3	Fort Huachuca, Arizona
2	Fort Richardson, Alaska
1	Presidio of San Francisco, California
1	West Point, New York
3	Fort Monroe, Virginia
6	Seoul, Korea
1	Fort Sam Houston, Texas
1	Denver, Colorado
2	Fort McPherson, Georgia
1	Rock Island, Illinois
2	Fort Leavenworth, Kansas
1	Fort Hood, Texas
1	Fort Lewis, Washington
4	MacDill AFB, Florida
1	Aberdeen Proving Ground, Maryland
1	Fort Carson, Colorado
1	Fort Bragg, North Carolina
1	Fort Riley, Kansas
1	Fort Ord, California
1	Canal Zone
1	Fort Sill, Oklahoma
1	Fort Benning, Georgia
3	Military District of Washington
1	Fort Campbell, Kentucky
1	St. Louis, Missouri
1	Letterkenny Army Depot, Pennsylvania
74	*Utility fixed wing configuration
6	Special electronic mission aircraft (production delivery starting 2nd Qtr FY 80)
80	TOTAL

*As of 15 January 1980

Figure 3 PARTS REPLENISHMENT

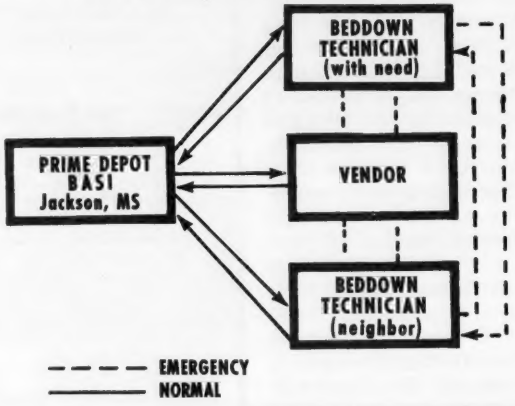


Figure 4 : RATE COMPARISON

Fiscal Year	OR Rate	NORS Rate	NORM Rate
1976	92.5%	3.0%	4.5%
7T	91.0%	3.0%	6.0%
1977	91.5%	3.0%	6.5%
1978	91.6%	1.2%	6.9%
1979	91.8%	2.0%	6.2%
DA STANDARD	80%	10%	10%

Figure 5 : FLIGHT HOURS COMPARISON

Fiscal Year	Year End C-12 Inventory	Flight Hours Programed	Flight Hours Accomplished	Percentage of Flight Hours Obtained
1976	20	5,800	4,548	78.41%
7T	20	3,000	2,877	95.90%
1977	36	16,000	16,306	101.91%
1978	56	27,050	28,050	103.69%
1979	74	37,615	41,308	109.82%

Figure 6 : COST COMPARISON

Fiscal Year	Year End Inventory	Number of Locations	Logistic Cost in Millions of Dollars
1976	20	17	$1.532
7T	20	17	.571
1977	36	24	3.082
1978	56	36	5.719
1979	74	43	7.800*

*Estimated

5, one can conclude that the C-12 logistical support concept has been successful.

The Army has used fewer C-12s to meet larger mission requirements, but the greater airlift capability has not come without cost. The Troop Support and Aviation Materiel Readiness Command (TSARCOM) annually negotiates a firm fixed-price C-12 logistical support contract with BASI. The basis for contract negotiations is the C-12 flying hour program of 600 hours per aircraft per year. The contract for all C-12s includes the cost of maintenance, spare parts, component overhaul and reimbursable items such as travel, customs, duties and taxes. However, the basic contract does not include cost for such items as the repair of aircraft damaged in crashes or for the repair of over-torqued engines. Under the contract all hours flown in excess of 600 are billed as a separate cost, but hours under 600 are not reimbursed. Figure 6 depicts the Army's cost for the contract over several years.

Even though the annual contract covers most C-12 maintenance, the Army is not locked into using contractor maintenance for future years. TSARCOM annually performs a cost study and determines whether the BASI contract maintenance program is more cost-effective than in-house Government support. The study compares all phases of the civilian maintenance cost to the projected costs of a Government support program. For example, the 1979 cost study indicated that the 20-year life-cycle cost for contractor support would be $338 million compared to $349 million for Government support. The difference of $11 million in favor of contractor support and the high OR rate led the Army to again choose the contracting approach for C-12 logistics support.

Communication is one of the keys to the success of the C-12 maintenance program. With delivery of the first C-12, the TSARCOM readiness project office (RPO) established

a communication procedure for normal and emergency conditions. The RPO advises BASI of C-12 users' recommendations for improving C-12 capabilities and performance. (Figure 7 shows the line of communication matrix.)

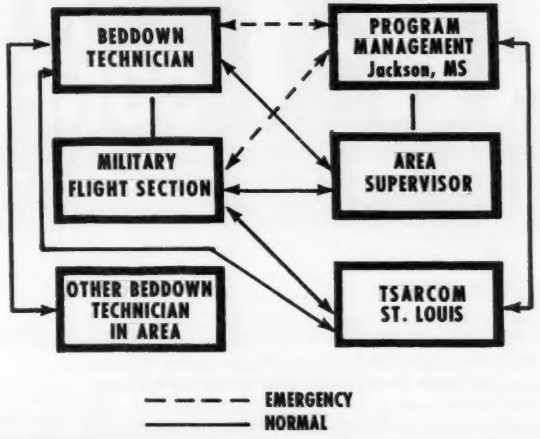
Effective coordination between TSARCOM and BASI has brought significant improvements in maintenance posture and cost control. The improvements were made by production modifications or by the product improvement program. Major product improvements include the installation of extended-range fuel tanks beginning with BC-14, replacement of the VHF-20A radios with VHF-20B radios in all C-12 aircraft, installation of a UHF ARC-164 radio in OCONUS (outside Continental United States) aircraft, and installation of fuel grounding receptacles on all C-12 aircraft.

To ensure the continued excellent safety record of this aircraft, four other improvements were included on production aircraft beginning with BC-61. These improvements include installation of the 850 shaft horsepower PT6A-41 engine instead of the lower powered PT6A-38 engine, a propeller autofeather/syncrophaser system and a main landing gear deicing system. The Army plans to initiate a field retrofit program for the same items on the first 60 aircraft during fiscal year 1980. Future C-12 aircraft will not only have these improved capabilities, but they also will have a cargo door, a high flotation landing gear, a stiffer wing and an increased gross weight (13,500 pounds). These modifications will increase a bulk cargo capability and enable the C-12 to operate from unimproved runways.

The C-12 maintenance contract directs the contractor to handle all emergency or urgent safety related actions that require grounding or special inspections of the C-12 for safety of flight. Airworthiness directives and BASI service instructions provide onsite contractor personnel with methods, techniques and practices acceptable for repair and inspection of the C-12. TSARCOM and the U.S. Army Safety Center, Ft. Rucker, AL, work with BASI to correct all safety problems.

In a formal system assessment of the C-12 aircraft, users of the C-12 concluded that it is the Army's best fixed wing utility aircraft. It either meets or exceeds mission requirements, and the logistics support concept for the C-12 surpasses all expectations. The contractor can maintain the C-12 on a worldwide basis in a high state of readiness at a cost less than it would cost the Government to assume full logistics support responsibilities.

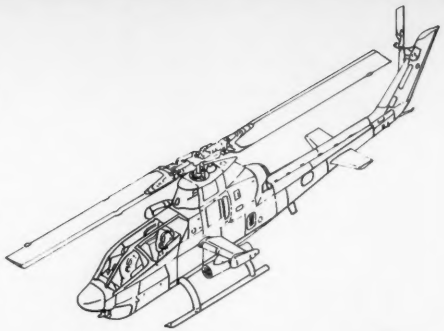
Figure 7 COMMUNICATION



AH-1 MODEL CONFIGURATION

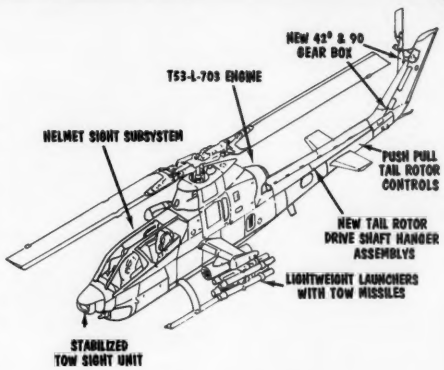
Prepared by LTC Floyd Eberhard when he was with the AH-1 Cobra PM office

AH-1G: This is the basic Cobra attack helicopter model that was inducted in the Army inventory in 1966 and served so well in Vietnam. It is two placed, tandem seated, and is powered by a single T58-L-13 gas turbine engine that can develop 1,400 shaft horsepower. It has a narrow fuselage, skid-type landing gear, a single two bladed main rotor and two small tapered mid-wings with provisions for firing a wide variety of ordnance. The 2.75 inch rocket is the main ordnance for these mid-wings. There is a chin turret, located in the nose below the copilot/gunners compartment, which mounts a 40 millimeter grenade launcher and a 7.62 machinegun. The primary missions for this model are direct aerial fire support and armed escort/reconnaissance.



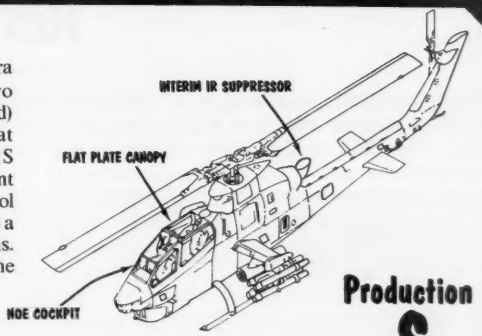
G

AH-1S (Modified): This model was developed to provide the Army with a day airborne antitank capability. It is an AH-1G that has been product improved with the tube-launched, optically-tracked, wire-guided (TOW) missile subsystem, the helmet sight subsystem and modifications to the chin turret. You can distinguish this model from the AH-1G by its snub-nose appearance, which results from the nose mounting of the telescopic sight unit (TSU), a component of the TOW missile subsystem. Another difference is the TOW launchers mounted on the two small tapered mid-wings. It is powered by a single T-53-L-703 gas turbine engine that can develop 1,800 shaft horsepower. It is capable of firing 2.75 inch rockets and has the same chin turret which mounts the 40 mm grenade launcher and 7.62 machinegun as the AH-1G model. The primary mission for this model Cobra is antiarmor; however, it is also capable of accomplishing the direct aerial fire support and armed escort/reconnaissance missions.

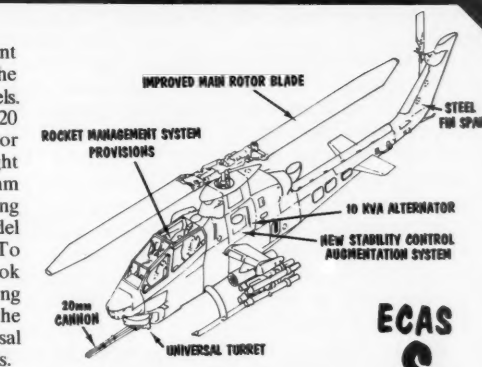

NEW 42° & 90 GEAR BOX
T53-L-703 ENGINE
HELMET SIGHT SUBSYSTEM
PUSH PULL TAIL ROTOR CONTROLS
NEW TAIL ROTOR DRIVE SHAFT HANGER ASSEMBLYS
LIGHTWEIGHT LAUNCHERS WITH TOW MISSILES
STABILIZED TOW SIGHT UNIT

Modified S

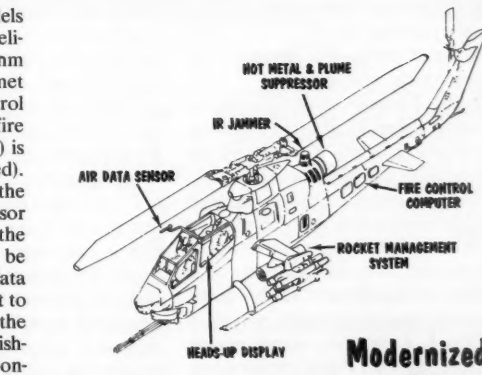
AH-1S (Production): This is a new production model Cobra that was derived from the AH-1S (Modified). It is two placed, tandem seated, like the AH-1G and AH-1S (Modified) models. The major outward appearance change that distinguishes the AH-1S (Production) from the AH-1S (Modified) is the seven plane semiflat crew compartment canopy. New pilot and copilot/gunner instrument and control panels have been added with the instruments arranged in a "T" configuration to enhance nap-of-the-earth operations. The weapon subsystems and missions are the same as the AH-1S (Modified).



AH-1S (ECAS): This AH-1S Enhanced Cobra Armament System (ECAS) model represents the 98 helicopters off the production line following the 100 AH-1S (Production) models. It is equipped with a new universal turret which mounts a 20 mm cannon and has a new fiberglass improved main rotor blade. The weapon subsystems consists of the helmet sight system, a chin universal turret which mounts the 20 mm cannon and the TOW missile system. Until the new wing stores rocket management subsystem is installed, this model doesn't have the capability to fire the 2.75 inch rockets. To distinguish this model from the other AH-1S models, look for the new main rotor blades with tapered tips, the long triple-stacked gun barrel of the 20 mm cannon and the absence of a fairing around the chin mounted universal turret. It has the same missions as the other AH-1S models.



AH-1S (Modernized): This model consists of AH-1G models that have been product improved and new production helicopters. Its armament configuration consists of a 20 mm cannon in the universal turret, the TOW missile, helmet sight and 2.75 inch rocket subsystem. A new fire control subsystem consisting of a pilot head-up display (HUD), fire control computer (FCC) and air data subsystem (ADS) is the major improvement added to the AH-1S (Modernized). It has an infrared (IR) jammer mounted on top of the engine fairing and hot metal plus plume IR suppressor extending from the back of the engine which enhances the aircraft survivability equipment on the Cobra. It can be distinguished from the other AH-1S models by the air data sensor mounted on the top of the canopy extending out to the right side of the aircraft. The primary mission for the AH-1S (Modernized) is antiarmor. It is capable of accomplishing the direct aerial fire support and armed escort/reconnaissance missions.



Airmobility Revisited

continued from page 5

tinuing attention—operations in (1) marginal weather and (2) at night. Expanding the boundaries of our capabilities in such operations was of obvious importance.

Our approach was first to understand where Army Aviation stood at that time in night/weather operations. We found a wide variation of capabilities among our aviators, and widely different views as to what our aviators and aviation units should be called on to perform under various conditions of night and weather.

From this sampling we came up with three principal ways to improve our capabilities. First was better training and lots of practice. Second was to seek improved equipment. Third was to use equipment already in being in new or better ways.

As an example of better training and practice we set up a training program for our flying units in which they trained only at night for extended periods. This was not popular with the wives and girl friends of our aviators, but it produced ***phenomenally better*** night flying performance. We also stressed a lot of instrument flying within our units and recommended expanding instrument training at the U.S. Army Aviation Center, Ft. Rucker, AL for incoming new aviators.

Toward improved equipment we did some things locally like improvising running lights for helicopters that could not be seen from beneath. Further, we encouraged the research and development community to press on with its infrared night vision equipment. We also added to our Tables of Equipment such equipment as portable ground controlled approach radar to permit pretty much all-weather flight between any two landing sites so equipped. Another attempt that comes to mind was a highly simplified air traffic control procedure called Red Dog innovated by one of our experienced aviators. Essentially it permitted single ship flights in very marginal weather to home on and let down over a simple directional beacon. We got the Federal Aviation Administration (FAA) in Atlanta, GA interested in Red Dog and in some derivatives of concept to Armywide acceptance.

As far as the third approach to improvement, primarily we sought to expand our night capabilities using various forms of artificial light. We considered flares and searchlights. In each case we tried both onboard equipment and that projected from the ground. The idea for ground based searchlights harked back to my World War II experience in Holland where I had seen the British Army make excellent use of batteries of searchlights pointed skyward over the enemy to produce what they called "artificial moonlight."

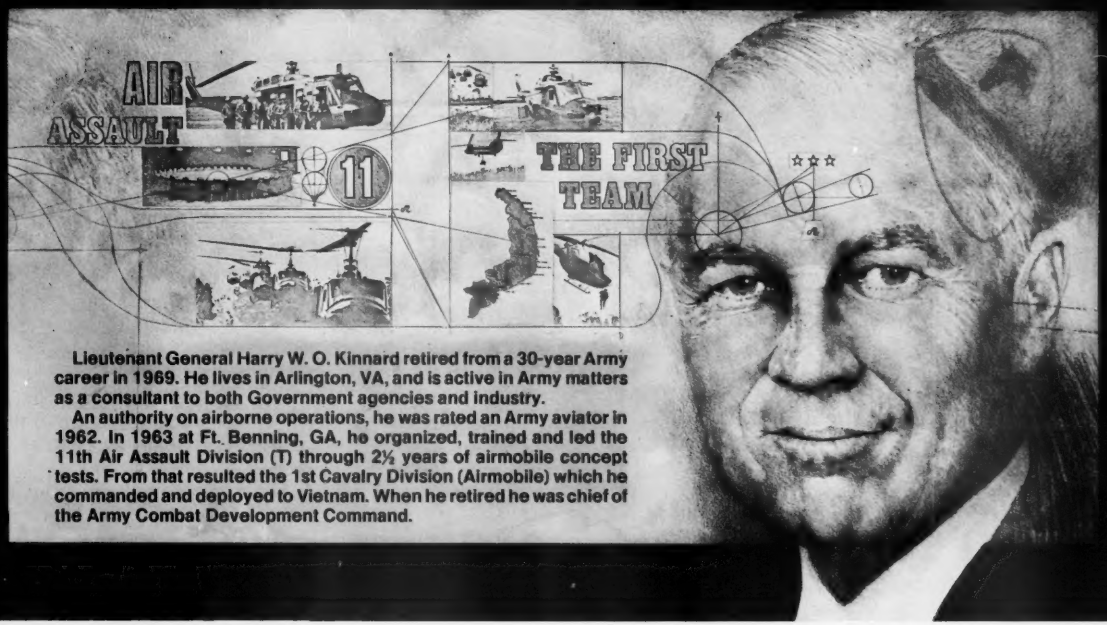
Looking back now at these early 1960 efforts it seems we have come a long way in night/weather capabilities for Army Aviation. Certainly Ft. Rucker's instrument training is now producing a fine initial capability in each graduating aviator. Certainly the strides in night vision equipment from the "Cav-Nav" goggles to the various forward looking infrared equipments are impressive. My only caution would be that none of this eliminates the need for lots of training and practice by aviation units.

One final thought on weather learned in Vietnam with the First Cav—commanders must gain the habit of thinking in terms of what I call *micro weather.* Helicopters can operate at such low ceiling/visibility limits (at reduced speeds) that the weather in a division commander's area is seldom—*very seldom*—unflyable throughout. It is quite important for the commander not to think of weather as just plain lousy everywhere—that's easy to do when it's like that where you are. His attitude must be, "we'll operate where we can, when we can." And he should give the authority to each local commander to judge his particular weather on a minute by minute basis. As a corollary, we need better weather reporting based on this idea of *micro* rather than *macro* weather.

One facet of the airmobile state of mind was easier to propound than to instill. This was the obvious need at every level for great mutual understanding and confidence between the aviators who flew the helicopters and the combat Soldiers who were their sometime passengers. Obvious, yes; trite, maybe; but a rapport at the very heart of fast, precise performance whose payoff is victory. I know that in theory our aviators are "Soldiers first and flyers second." I'm aware that supposedly "Army Aviation is now so much a part of the Army everyone can use it, just like trucks." Unfortunately, it just ain't so. It wasn't so during our testing and, sadly, is probably even less so now.

For today, with our Specialty 15 approach to aviation careers, we have in effect created a combat Aviation branch. Even though our commissioned aviators will still wear the branch insignia of the Infantry, Armor and so on, the career progression pattern simply does not include the programed opportunity for aviators also to master the intricacies of their branches. This is not the Army's fault, except insofar as it has failed to convince its masters in DOD and Congress that we need enough aviators both to man our cockpit seats and simultaneously to learn combat arms skills by attending branch schools and serving frequently in the combat arms. The problem, though, remains. The complete integration of Army Aviation

Illustration by Chet Jezierski courtesy of the Army Aviation Museum



Lieutenant General Harry W. O. Kinnard retired from a 30-year Army career in 1969. He lives in Arlington, VA, and is active in Army matters as a consultant to both Government agencies and industry.

An authority on airborne operations, he was rated an Army aviator in 1962. In 1963 at Ft. Benning, GA, he organized, trained and led the 11th Air Assault Division (T) through 2½ years of airmobile concept tests. From that resulted the 1st Cavalry Division (Airmobile) which he commanded and deployed to Vietnam. When he retired he was chief of the Army Combat Development Command.

operations into combined arms operations is more difficult and more important now than ever before. The difficulty and importance can only increase in the future. As an example, demands placed on the scout are awesome; and remember he may be a captain, a lieutenant or a warrant officer. A start in eliminating the problem is complete recognition of the need, and an understanding of the full implications of Specialty 15. In every aviation unit ample time must be allotted for a variety of schools and training in combined arms team operations. Informal exchanges in duty assignments between aviators and their nonrated peers must be continuous. Warrant officers must be viewed as more than flying technicians. Their tactical training should also be continuous. And certainly this is a two way street. Nonaviators in all parts of the Army must be not only encouraged but also *directed* to devote ample time to understanding the full capabilities and limitations of Army Aviation. The curriculum of the service schools should be much expanded in this respect. My recent inquiries indicate a frightening dearth of aviation related instruction. This has been a rather long excursion on one aspect of our 11th AAD efforts to develop an airmobile state of mind, but frankly the importance of this teamwork can't be overstated. This was accented during airmobile operations in Vietnam.

Next Month: General Kinnard looks at the future of Army Aviation, linking his recommendations to lessons learned in the 11th Air Assault Division (T) and the 1st Cavalry Division (Airmobile).

Reporting Final

Late News From Army Aviation Activities

FROM FORT RUCKER

ACAB Concept Approved. **The Army Chief of Staff has approved the Air Cavalry Attack Brigade (ACAB) concept for implementation and evaluation. The first ACAB is scheduled to be organized during early FY 81 in the 9th Infantry Division at Fort Lewis, WA.**

The ACAB is designed to maximize the capabilities of aviation within the division. The brigade structure also will provide Army aviators with career patterns similar to those of the other combat arms and aviation elements of the other military services.

Look for next month's issue of the *Army Aviation Digest* for more information about this new aviation organization.

New ATC TEC Lessons. Army air traffic control personnel (MOS 93H and 93J) should start checking their battalion TEC libraries for the new TEC lessons listed below. There are 10 of these which were designed especially for the controller. They are being fielded now and should be available in the July/August 1980 time frame:

222-011-6220-F	Provide Emergency Assistance
222-011-6221-A	Control Taxiing VFR Aircraft
222-011-6222-A	Control Departing VFR Aircraft
222-011-6223-F	Provide VFR Departure Separation
222-011-6224-F	Provide VFR Arrival Separation
222-011-6225-A	Control Arriving VFR Aircraft
222-011-6226-A	Solicit, Record and Disseminate PIREPs
222-011-6227-A	Issue Airport Condition Advisories
222-011-6228-A	Request and Deliver ATC Clearances
222-011-6229-A	Request/Deliver Special VFR Clearances **(DTD)**

Sound Advice to Graduates. Graduating classes were given good advice last month at the Aviation Center. MG Michael D. Healy, commanding general of the U.S. Army Readiness Region V, Ft. Sheridan, IL, told 48 new Army and Air Force aviators who were being graduated from the Officer and Warrant Officer Rotary Wing Aviator Classes that there are 28 places on earth now where people are or could be killing each other. "On each of these cards I'm holding is the name of a place in the world where human beings are actively trying to kill each other or where there are those seeking to do so," said General Healy. "There is shooting going on now in 23 of them." He added that all but a few of these are places where the United States could become involved.

"Don't close the door after this training," General Healy said. "Don't be a day-by-day, mission-by-mission oriented Soldier. Study new tactics...read publications...observe those things that are happening to the rest of the Army and keep in mind how you fit in the overall picture.

"You will be dealing in large amounts of your time with nonrated Army personnel," the general added. "Some of these people do not realize your great ability and will not appreciate it." He told them to have patience, do good for people regardless of their reactions, favor the underdog and always give the world the best they have.

MG Emil Konopnicki, the Army's assistant deputy chief of staff for logistics, told members of the Warrant Officer Senior Class that it was very important for them to understand logistics. "Make it your first order of business, because without fuel...without repair parts, you're nothing. Logistics is your responsibility. Remember that as long as you live, because if you don't, you just might not," he said.

The general mentioned four major programs that his branch has been challenged to undertake recently, including improved availability of repair parts.

"Aircraft readiness does not come cheaply. During the Vietnam era it represented 50 percent of the Army's total budget for depot maintenance," he said. "Today it is only 25 percent, and we believe it can be even lower." He said that with new lines of communications, repair parts are being moved faster and at less expense, thus improving readiness, which is another of the program goals, and saving money.

A new maintenance management improvement program also has been initiated which will enable better diagnosis of problems and help eliminate unnecessary repair jobs. "American people want an Army and know they need an Army, but they're not sure they can afford an Army," said General Konopnicki. He told them to act as if it were their own money they were spending whenever they have to decide whether or not to order something.

Another project General Konopnicki is working on is better structure of the logistics branch of the Army. He said the constant state of change now occurring in the logistics branch has caused it to be

fragmented and incomplete but they are working to improve it.

The general said the fourth program they are working on is better ability for rapid deployment. "This must be improved," he said. "If you're not ready, then you've got to say 'Why are we here?'"

General Konopnicki named good, well-trained people, parts, instruction manuals and tools as the order of importance for good readiness. "If you have these four things, then you've got good maintenance and you'll be ready," he said.

Hall of Fame Inductees. The contributions of seven men to Army Aviation were recognized last month when their names were added to the Army Aviation Hall of Fame during the Army Aviation Association of America (AAAA) national convention in Atlanta, GA.

Inducted for 1980 to 1983 were LTC Arthur W. Barr (Ret.), LTG Allen M. Burdett Jr. (Ret.), CW4 E.M. "Mel" Cook (Ret.), DAC Joseph P. Cribbins, COL John W. Marr (Ret.), MG George W. Putnam Jr., and the late LTC Robert L. Runkle.

Located at the Army Aviation Museum, Ft. Rucker, AL, the Hall of Fame is sponsored by the Army Aviation Association of America.

National award winners for 1980 who were recognized at the convention were: Brigade Aviation Section, HHC, 92nd Separate Infantry Brigade, Puerto Rico ARNG, Outstanding Reserve Component Aviation Unit Award; Ms. M.T. Margaret Brown, Army Troop Support and Aviation Materiel Readiness Command, St. Louis, MO, Department of the Army Civilian of the Year Award; CW3 Ernest W. Rickenbacker, 60th Company, 6th Battalion, 1st Aviation Brigade, Ft. Rucker, Army Aviator of the Year Award; CW3 Harold D. Hintze, 146th ASA Aviation Company (FWD), APO San Francisco, James H. McClellan Aviation Safety Award; SFC Leland E. Hinely, Company A, 501st Aviation Battalion (Combat), APO New York, Aviation Soldier of the Year Award; 146th ASA Company (Avn) (FWD), Army intelligence and Security Command, Outstanding Aviation Unit of the Year Award.

Broken Wing Award. MAJ Charles E. Merkel Jr., received the Army Broken Wing Award recently at the Army Aviation Center for safely landing his aircraft at night on a runway blocked by a herd of deer at Eglin Air Force Base, FL. The UH-1 Huey Major Merkel was flying developed hydraulic failure at an altitude of 7,000 feet. By using the manual throttle he was able to make spiral turns and safely land the craft which also had three passengers on board. **(USAAVNC-PAO)**

☆ ☆ ☆

FROM PHILADELPHIA

Operational Testing Finished. Army operational testing (OT) of two CH-47D prototypes at Ft. Campbell, KY, ended 2 May, 8 days ahead of schedule.

All data from the beginning of the developmental testing phase of two D prototypes at Ft. Rucker in December 1979 through OT will now become a part of the overall data package reviewed by the Army Systems Acquisition Review Council (ASARC) and Defense Systems Acquisition Review Council (DSARC). Favorable ASARC/DSARC decisions are required before a full production go-ahead for the CH-47D program will be authorized. Those decisions are expected to be made in August and September, respectively.

HOTLINE SERVICES

The following HOTLINE numbers can be called on official business after duty hours. They will be updated and reprinted here periodically for your convenience. If your agency has a HOTLINE it would like included, please send it to the *Aviation Digest*, P.O. Drawer P, Ft. Rucker, AL 36362.

		AUTOVON	Commercial
Aviation Ft. Rucker, AL		558-6487	205-255-6487
Engineer Ft. Belvoir, VA		354-3646	703-664-3646
Field Artillery Ft. Sill, OK	ARTEP	639-2064	405-351-5004
	Redleg	639-4020	405-351-4020
Infantry Ft. Benning, GA		835-4487	404-545-4487
	ARTEP	835-4759	404-545-4759
Intelligence Ft. Huachuca, AZ	Training	879-3609	602-538-3609
Missile & Munitions Redstone Arsenal, AL		746-6627	205-876-6627
Ordnance Aberdeen Proving Gnd, MD		283-5542	301-278-5542
Quartermaster Ft. Lee, VA		687-3767	804-734-3767
Signal Ft. Gordon, GA		780-7777	404-791-7777
Transportation Ft. Eustis, VA		927-3571	804-878-3571

U.S. ARMY

AVIATION STANDARDIZATION

Directorate of Evaluation/Standardization

REPORT TO THE FIELD

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362; or call us at AUTOVON 558-3504 or commercial 205-255-3504. After duty hours call Fort Rucker Hot Line, AUTOVON 558-6487 or commercial 205-255-6487 and leave a message

Aeroscout Selection Procedures

GONE ARE THE good old days of the dart board or the "hey you" roster for picking students best qualified to fly the demanding and increasingly important aeroscout mission on today's mid-intensity, mobility oriented battlefield. No one would deny that a combination of special qualities is necessary to survive and effectively perform in the multitask, rapidly changing, high risk environment that will be the scouts' territory in the next war. Therefore, the traditional methods of selecting the best qualified for the job must be replaced by more effective methods of personnel selection.

The new techniques must be based on sound, objective criteria, rigorously tested and proven to effectively predict success during training, and more critically, success in mission performance. How can we improve the tried and true "dart board" with which we are so familiar? The research psychologists of the Army Research Institute (ARI) Field Unit located at the U.S. Army Aviation Center at Ft. Rucker, AL have developed a better "dart board." The technical term for the new dart board is the *aeroscout selection algorithm.* To understand the new aeroscout selection procedure, a review of the development of selection procedures in Army Aviation is in order.

The original Flight Aptitude Selection Test (FAST) was the Army's first improved dart board. The FAST was made operational in 1966. The pre- and post-FAST flight training success rates are shown in figure 1. The use of the FAST test to screen applicants for flight school increased the success rate by 15 percent across the board.

So what does this have to do with the Stetson wearing, spur toting aeroscout pilot candidate? The answer is everything! If a procedure can be developed which effectively identifies those characteristics that accurately predict the successful completion of aeroscout training and field mission performance, then the old dart board can be retired. We can then enjoy the same increase in quality in aeroscout training and subsequent field performance that was realized in flight training with the institution of the FAST.

When the Aviation Center adopted the dual track Initial Entry Rotary Wing (IERW) program in June 1977, ARI was tasked to develop and validate a method to identify the flight training students who would perform most successfully in the aeroscout role. Subject matter experts—experienced aviators in the aeroscout, attack and utility missions in the field—were interviewed to determine selection criteria that would identify successful aeroscout trainees and pilots. The responses obtained from the interviews were used to draft a questionnaire containing 26 characteristics which could differentiate between the three rotary wing missions.

The questionnaires were administered to 120

experienced aeroscout, utility and attack aviators serving with the 6th Cavalry Brigade (Air Combat) at Ft. Hood, TX. Each pilot completing the questionnaire ranked the relative importance of each of the 26 characteristics for each mission type. The criteria for selection to the aeroscout track of the IERW program was determined from the averaged rankings of the 120 aviators completing questionnaries for the aeroscout mission. The nine characteristics (variables) predicting success in the aeroscout track of the IERW program and mission performance in the field are listed in figure 2 along with the weights used to input the relative importance of each variable into the algorithm (weighted mathematical combination of variables). The weights were derived from the average importance of each ranked characteristic as listed by the 120 aviators.

That's fine for theory but how does all of this work in real life? First, trainees are screened for compliance with Department of the Army policy. All aeroscout trainees must be on active duty or if in the Army National Guard, they must be selected for aeroscout training by the National Guard Bureau. Currently, all pilot trainees in the aeroscout program must be male and if they are commissioned officers, they must be assigned to one of the combat arms. And finally, aeroscout selectees must not have been set back for flight or academic deficiency in the IERW program. Trainees are evaluated on the nine variables by two or more individuals.

Each pilot trainee is rated by a primary phase instructor pilot in the 10th week of training and by a UH-1 Huey transition phase instructor pilot in the 14th week of training. Warrant officer candidates (WOCs) receive an additional rating from the training, advising and counseling (TAC) officer prior to the end of the 14th week of training. Trainees also complete a preference form, listing in order their preference for the utility, aeroscout, attack and cargo missions. The preference form also provides consideration for turnaround training in attack aircraft. Figure 3 lists the source of trainee ratings for each variable in the algorithm.

All rating forms, the student preference form, and class flight and academic records are forwarded to the Directorate of Evaluation and Standardization (DES) where the information is coded for use in a computer program. This program calculates the algorithm score for each student and arranges the students in order by preference and algorithm composite score. The student list is forwarded to the student personnel operations section of the Directorate of Personnel and Community Activities where the assignment of WOCs to the aeroscout track is made objectively from the rank ordered roster. Officer assignments made by MILPERCEN (Military Personnel Center) are checked and validated and if appropriate AH-1 Cobra transition quotas are filled from the rank ordered list of trainees indicating a preference for turnaround training in attack aircraft.

The idea sounds good, but is it *really* better than the old dart board? To determine whether the algorithm works, and how well it works, ARI compared the "predictions" of the composite algorithm score against three criteria: the IERW overall grade, the aeroscout tactics grade and aeroscout mission proficiency in the field. A sample of 147 warrant officer and 101 officer IERW graduates was used for the comparison. Grade comparisons were made by comparing algorithm predictions with student records. Mission proficiency assessment was performed by standardization instructor pilots of the flight standardization division of DES using a mission proficiency scale (MPS) developed by ARI (by sampling the performance of recent aeroscout track graduates on flight standardization visits to field units). Ideally there should be a strong correlation between the algorithm score and the three test criteria, *and in actuality there was!* The comparisons indicate that the algorithm is an effective predictor of aeroscout tactics grades and that it appears to be effective at predicting aeroscout mission proficiency in the field.

So it looks as though the old dart board can be retired. If this idea is so good what can we expect next? Just as the original FAST underwent revision resulting in a more efficient method of selecting potential flight trainees, so must the algorithm be refined to identify more accurately the characteristics which predict performance in the aeroscout mission in the field. Continued performance evaluation of

Figure 1: Success Rate In Flight Training

	Percent Completion Flight Training
Officers	
Prior to Implementation	
FAST	**75%**
Current	**90%**
WO Candidates	
Prior to Implementation	
FAST	**50%**
Current	**65%**

recent aeroscout graduates in the field using the MPS and subsequent modification of the algorithm can substantially improve the accuracy of the selection procedure for aeroscout training.

The research conducted at Ft. Hood indicated that the criteria for success in the attack mission was similar to that for the aeroscout mission. Evaluation of the aeroscout algorithm as a predictor of success in the AH-1 aircraft qualification course (AQC) indicates that it is superior to trainee mission preference and to the IERW overall grade as a predictor of AH-1 AQC grades for turnaround IERW students. Because of its reliability it is used to rank order trainees for possible selection for turnaround training in the AH-1.

With the possibility of a multitrack IERW flight training program, the procedures used to develop the aeroscout track selection algorithm hold great promise for discriminating between trainees best qualified to successfully complete training and effectively perform in the field. The aeroscout selection algorithm provides the same quantitative improvement in dual track selection as the initial FAST provided for aviation trainee selection. Additionally, the algorithm provides a dimension for dual track selection which even the revised FAST does not provide for initial trainee selection, namely accurately predicting success in mission performance in the field.

The ultimate test of the algorithm as a valid selection procedure is the degree of satisfaction of field commanders with the product produced by the algorithm and the aeroscout training program. It would be safe to say, however, that the aeroscout pilot of today can polish his spurs a little brighter and wear his Stetson a little prouder knowing that he is the best man for the job.

Material for this article was taken from:

- ARI Research Memorandum 78-2, Eastman and McMullen
- ARI Research Memorandum 78-4, Eastman and McMullen
- ARI Working Paper FR/FU 79-4, Dohme and Sanders
- USAAVNC Cir 350-1, Aeroscout Selection Procedures

Figure 2: Variables/Weights Which Serve As Predictors In The Aeroscout Algorithm

No.	Variable Name	Weight
1	Map Reading Skills	.475
2	Sense of Direction	.453
3	Flying Ability	.428
4	Leadership Abilities	.366
5	Performance Under Stress	.463
6	Teamwork Ability	.444
7	Ability to Divide Attention	.434
8	Verbal Expression	.394
9	Aggressiveness	.391

Figure 3: Source Of Evaluation For Predictor Variables

No.	Variable Name	Source
1	Map Reading Skills	IP Evaluation
2	Sense of Direction	IP Evaluation
3	Flying Ability	IP Evaluation
4	Leadership Abilities	IP & TAC Off Evaluation
5	Performance Under Stress	IP & TAC Off Evaluation
6	Teamwork Ability	IP & TAC Off Evaluation
7	Ability to Divide Attention	IP & TAC Off Evaluation
8	Verbal Expression	IP & TAC Off Evaluation
9	Aggressiveness	IP & TAC Off Evaluation
10	Standing in a Typical 25 Trainee Group	IP & TAC Off Evaluation
11	Average Grade at 14th Training Week	Academic Record Printout

A briefing being given on "Operacion Accion Civica Da Salud" to the CH-47 crew and members of the Guardia Nacional

OPERACION ACCION CIVICA DA SALUD

Colin Hale
Public Affairs Office
193d Infantry Brigade (Panama)
APO Miami 34004

Personnel from Panama's Ministry of Health and the Guardia Nacional prepare to board the CH-47 at France Field

Other Los Uveros residents await their turn for vaccinations in another thatched roof hut

Residents of Los Uveros queue up for medical examinations conducted in a thatched roof hut.

A dentist extracts a tooth from a resident of Los Uveros while others await their turn

Near tears, this youngster waits for the Novocain to take effect and the resultant removal of a tooth

Photographs by MSG Dale Broyler

THE 193D INFANTRY Brigade (Panama) teamed up with Panama's Ministry of Health and the Guardia Nacional to form part of "Operacion Accion Civica Da Salud" (Civic Action Operation Gives Health), a nationwide program conducted 25 to 27 January 1980 to take medical care to isolated rural areas.

The program involved 3 days of flying medical, dental, pharmaceutical and vaccination teams into isolated jungle villages by UH-1 Huey helicopters of the Guardia Nacional's Fuerza Aerea Panamena (FAP).

To complete a task of this magnitude in a short period of time, the Guardia Nacional, through the U.S. Military Group (USMILGP) in Panama, requested from the U.S. Southern Command helicopter airlift assistance for a large medical team going to Los Uveros, a village west of the southwest tip of Gatun Lake.

In turn, the 193d Infantry Brigade tasked the 210th Aviation Battalion to pick up the medical team in France Field early Friday.

It took two trips from France Field to Los Uveros to airlift about 40 persons and thousands of pounds of equipment ranging from camp cots to baby scales to a washing machine to a portable generator.

At Los Uveros the procedure was much the same as that followed at Cerro Miguel which the team visited on Saturday, with the aid of a CH-47 Chinook, returning to Los Uveros in the evening.

On Friday, the aircrews also flew to El Congo and brought the villagers there to Los Uveros for treatment. That day, too, they flew several more serious cases to France Field for treatment in a Colon hospital.

On Sunday, A UH-1 Huey of the Air Ambulance Section, U.S. Army Medical Department Activity was called to Los Uveros to evacuate a 6-month-old baby suffering from convulsions. And Sunday, the Chinook made two trips to return the medical team to Colon.

During the mission the Chinook flew 6.8 hours, carried 193 passengers and 12,600 pounds of cargo and consumed 2,003 gallons of fuel supplied by the FAP which stationed a tanker truck at France Field.

Preliminary estimates by the Ministry of Health indicate that during the 3 days the doctors examined 1,125 people, the dentists performed 134 extractions, the veterinarian injected 101 dogs and the "cedula" team filled in 84 applications for "cedulas" (identification cards).

Soldiers from the 352d Aviation Company who participated were CW4 Alvie P. Cook Jr., CW3 Joseph L. Jones, SGT Carl Wagner, SP4 Lester D. Hunt, PFC Jose Rivera, CW2 Jurgen Stark, SSG Raul De Alva, CW3 William Rehtus, SSG Normal Schneider and SGT Cecil C. Austin.

MONTHLY WRITING AWARD

A seasoned aircrash investigator shares his feelings and thoughts at the site of a fatal crash

What it's really like

IT WAS A beautiful day, bright, clear, and so very calm.

Whop, whop, whop. "Coming up on the crash site, sir." The headset jarred me back to reality. "Wanna make an overhead pass, sir?"

I replied, "Roger, give me a couple of three-sixties to the left so I can get a good view."

"Will do. We're on it now, starting a left break."

Good God, I thought, as I looked below. How could a helicopter make such a mess? I looked around our own aircraft. The UH-1 is a pretty solid bird. The one directly below me was spread over an area about 200 yards long and 40 yards wide. It seemed broken in a thousand pieces and was still smoking in various places. The ground was twisted and torn from the violent impact and small trees had been cut, uprooted, and in some areas destroyed. It was easy to see the initial impact point and where the wreckage had fanned out down a small hill into a creek.

The same questions I had asked myself many times

over the past 15 years began to form in my mind. What happened? What went wrong? Why did it happen? As a seasoned investigator I was anxious to solve this mystery.

I had been briefed before we left the airfield that the UH-1 had been on a routine administrative flight with five people on board. The crash had occurred about 3 hours earlier. There were no survivors. The wreckage was roped off and being guarded by state troopers. Nothing had been moved, including the bodies.

The only cargo was three cases of C-rations, two 5-gallon Jerry cans of water, and some small engineer equipment necessary for the field topographic team.

The pilot-in-command was an "old pro" with more than 3,000 hours and noted for his calm and safe approach to everything. He was, by all standards, a very mature and professional aviator and was often heard to remark that he had enough excitement back in '68 during the TET Offensive in Nam.

The pilot was a young fellow recently out of flight school with, from all indications, a very bright future. The crewchief was a very conscientious lady who some said was the best crew chief in the battalion. She had just been selected as the Soldier of the Quarter.

One passenger, a young PFC, was just along for the ride. This was his first helicopter flight and it was rumored he was considering applying for the warrant officer flight program. The other passenger, an Engineer lieutenant, was a quiet bespectacled fellow with more academic degrees than a thermometer. He had been married only one month. There certainly were no obvious problems with the crew, passengers, or cargo.

As the wind blasted into my face through the open doors of the Huey, I briefly looked at my team. All were seasoned aircrash investigators, knew their jobs well, and knew exactly what to do once we landed. The "Doc" would supervise removal of the bodies, study the survivability aspects of the mishap—the life support system—and conduct the human factors investigation. The maintenance officer and his technical inspector would be all over the wreckage, analyzing every single part for mechanical problems. Fuel, oil, and hydraulic samples would be taken to determine if certain parts should be submitted for detailed analysis at the Corpus Christi Teardown Facility.

My recorder would be busy obtaining statements, interviewing witnesses, and ensuring that proper photographs were taken. The UH-1 SIP would help study the unit records and crew qualifications and conduct a thorough analysis of the flight up to the time of the crash. He would also help the maintenance officer carefully record and study all instrument readings and positions of the flight controls.

Then there was Pete, the civilian air safety specialist. He had been investigating air crashes since before I was born. He was my technical expert and a true sleuth on the crash site, with a reputation for rooting out the cause even on the most difficult of crashes.

The safety officer of the unit which had the accident was along to provide administrative and technical assistance. He sat quietly with a faraway look. The pilot-in-command had been his close personal friend and had saved his life in Vietnam. The night before, both families had spent the evening enjoying a backyard cookout. What were his thoughts and feelings now?

The pathologists were en route from the Armed Forces Institute of Pathology in Washington, D.C. This crash would keep them busy!

The inevitable strain showed on all our faces. In spite of our experience, we still had that sick, gut-rending feeling associated with a fatal aircrash. We all prayed the occupants would be intact, but it was clear we were in for a grisly scene. No matter how many times you see it, no one becomes totally comfortable around mutilated bodies.

As our pilot settled in for landing, I took a long deep breath of clear fresh air, knowing it would be the last for a while.

The headset came alive again. "Sir, we're gonna shut down and wait for you if that's okay."

"Roger that. Once we've finished some preliminary work, the Doc may want to use you to take the bodies to the hospital." I immediately saw the sick look on the young pilot's face.

Before disconnecting the headset I overheard him say, "I'd hate to have their job." The fellow didn't know how much I hated it, too! I don't mind safety work, but I sure hate this part of it.

We regrouped the team at the impact point and began our initial walk-around and observation of the wreckage. I've seen many crashes but I've never become accustomed to the brutal, stark reality of twisted and broken metal and bodies. A combination of burning metal and wood, fuel, oil, and hydraulic fluid, and that peculiar odor of burned bodies permeated the air.

Major Samuel C. Raines
Directorate for Aviation Systems Management
U.S. Army Safety Center

WHAT IT'S REALLY LIKE

I am continually amazed at the destruction that occurs when 8,000 pounds of man and machine strike the earth at forces exceeding 80 times the force of gravity. I kept glancing at the Huey that brought us to the crash site. It looked like an aircraft. The aircraft scattered before me was identical except the largest piece intact or recognizable was a portion of the tail boom.

At the impact point, the first objects identifiable were portions of the pilot's pedals and the landing light. Not far away was the heel of a boot. There were literally hundreds of small parts of debris, mostly unrecognizable. There was a crushed door, a portion of a seat cushion, the side of a flight helmet . . . containing an ear. There were deep cuts in the ground, probably from the main rotor blade as it tore itself to pieces. In one of the cuts I noticed a flight glove, complete with hand and part of an arm. Instruments were lying everywhere. In a crumpled piece of jagged, partially burned metal, which was later identified as the PIC's seat, was a small lumpy mass . . . something totally unrecognizable as anything human. A 190-pound man had been reduced to a mass of about 50 pounds . . . at least that's all we would find.

We were all having our own thoughts and I realized that about now the chaplain would be arriving at the dead PIC's quarters. How would his wife react . . . and especially his 9-year-old son? They had been very close.

It's hard to realize how many miles of wiring are in a helicopter, yet before us was wiring of all sizes and colors mixed with a multitude of other debris. I could not step anywhere without touching some part of the wreckage. A portion of the main rotor stuck out of the ground about 5 feet. One edge contained residue of human tissue, mute evidence that the blade had entered the cockpit or someone had been thrown through the blades during the crash.

The pilot's body was spread over an 80-yard area. I looked around at my team, shocked with the realization of how a person can be normal, healthy, and happy and in a split second become a charred mass, broken and spread about on the ground. The pilot's right arm and hand (severed at the elbow) was still clutching a portion of the cyclic. I couldn't help but wonder how his 6-year-old daughter would react when Daddy wasn't there to tuck her into bed and say prayers tonight. Her picture was torn and muddy, as were all the contents of his wallet, which now lay scattered around the wreckage. Did he feel any pain? What were his thoughts just before impact?

A mass of molten metal lay smoking a few feet away. This had been the cabin compartment. The powerful stench indicated some portion of human anatomy had burned in the fire. That's one odor you can never forget.

"Over here, Sam!"

I glanced over at the Doc who was motioning for me to join him. A state trooper was pointing up into a small tree down near the creek. I made my way down to them, being careful not to disturb the wreckage.

The Doc look grim. "Sam, there she is."

"Lord, give me strength," I muttered under my breath. The once attractive crewchief had been thrown from the crash. She now hung limply in the tree, battered and bloody, and it was obvious that every bone in her body was broken. Once again I felt that same old sense of frustration . . . why, why, why? What can I as a safety officer do to stop this senseless waste of people and equipment?

The weight of my responsibility returned when the flight surgeon asked how soon we could move the bodies. As I moved back up the hill to brief the team on special requirements, many thoughts flashed through my mind. Why did these people have to die so violently? They were all good people deserving a full chance at life. In their prime, they had all come to a quick and terrible end. And their families would be left behind, perhaps to grieve forever. What effect would these deaths have on the young children left? Only time would tell.

I was almost up the hill when the maintenance officer yelled, "Look at this!" He pointed to the tangle of high tension wires wrapped around the mast. In spite of all my training as an investigator, which had taught me not to focus on the obvious until all the facts are known, I immediately knew this helicopter had hit wires.

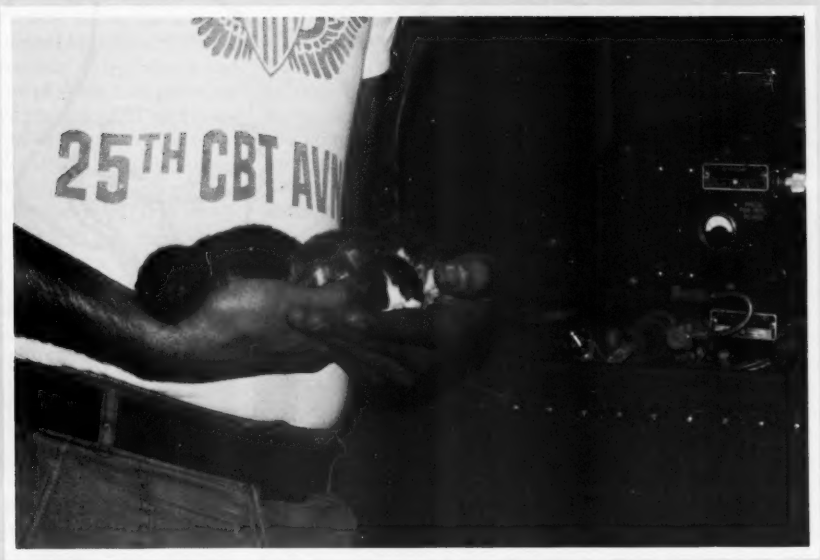
WIRE STRIKE! The words leaped out at me. For the past 5 years Army aircraft have been hitting wires on an average of once every 15 days. Since the first of January 1974, there have been 136 wire strikes. Unfortunately, like this one, many have been fatal.

The above mishap is fictitious. You can, however, be sure that the sights and thoughts described here have been experienced time and time again by Safety Center investigators. This vivid account is presented so pilots can understand our sometimes emotional plea to follow accepted safety practices.

Wire strikes are not confined to a particular age group or experience level. The only common denominator seems to be a violation of safe flying rules and commonsense. If units would follow the seven steps for wire strike prevention published in the article "Wire Strikes" in last month's AVIATION DIGEST, the number of wire strikes and lives lost could be considerably reduced.

F,O and D

These cute little kittens were found in an AH-1G during an inspection. Members of the 25th Combat Aviation Battalion, 25th Infantry Division, named the kittens F, O and D so they would serve as a daily reminder of the damage that can be done to aircraft by foreign objects.



Major A. T. Hadley III, M.D.
82nd Airborne Division
Fort Bragg, NC

HEY, SKYDOC where have you been? This was one of the questions that one of Skydoc's aviator friends asked. I immediately began to explain that I was now in a non-flying slot, and that I was flying a mahogany five or the LGD (large gray desk) instead of whirly-birding around in exotic places and indeed came across the rare breed of Nomex covered nomads only rarely. Fortunately, sense prevailed, and with the aid of a hammerlock this advice results. (Aviators are forceful people as well as the best.)

What struck the feathered healer was an accident that occurred a few months ago. It seems that E4 Rotorwatcher, just one of the hundreds of good hardworking crewchiefs that watch that old bird of yours, decided to really go at it one night and celebrate. His idea of a celebration was to get "blown away," and drink as much alcohol as he could. The good stuff, the veritable and venerable stuff that was aged in barrels, was what he quaffed. Indeed, he chug-a-lugged the sauce. And he was found the next day quite cold and quite dead. Alcoholic intoxication, acute, lethal was the way the autopsy report read. Back to the 1930s where such deaths were playtime for the mobs. And, yet, E4 Rotorwatcher didn't doublecross anyone but himself.

So that set the old winged surgeon thinking about alcohol, booze, ambrosia of the grape, spirits, inebriants, and short two carbon fragments called ethanel. The danger that the old caduceus foresees is not E4 Rotorwatcher's tragic problem. No, not in the least—the problem is all of those rotored charioteers that hit the local club, bar, cafe, cabaret or bottle just a bit too hard, and come to work the next day with a hangover. Oh, not a bad one, like the king sized one that results from promotion or a new year—but just a nagging one that interferes with performance. This is what Skydoc sees is the danger of alcohol. The 10 percent impairment

that occurs day after day with many of the silent majority. The job gets done, but not as well as it could. The project is completed, but not as fast as it should have been. The mission was successful, yet not quite 100 percent safe. This is the true danger of alcohol—the not quite rightitis that occurs habitually. The drinks before dinner, wine with dinner, after dinner drinks syndrome is the syndrome that is the danger with alcohol. But this is not alcoholism, you say. You need to be a rummy, a wino on skid row, or have the shakes so bad that you can't pour another one in to be an alcoholic.

Quite the contrary according to the AMA, that ancient society called the American Medical Association, "Alcoholism is an illness characterized by significant impairment that is directly associated with persistent and excessive use of alcohol. Impairment may involve physiological, psychological or social dysfunction." Now that is subtle. Note that alcoholism is persistent, and that there is no one sign to rely totally upon, and that abuse may show itself in any number of guises. If that does not upset you, just remember that the National Council on Alcoholism estimates the number of alcoholics in the United States to be about 10 million. That is about 1 person in 20 is an alcoholic, frightening to us folks who are concerned with aviation safety because most indicators reveal that the incidence is rising. Total consumption of alcohol is rising, the liquor industry is expanding and per capita consumption is increasing. Furthermore, alcoholism appears to be considerably more prevalent among men than women. However, the number of known women alcoholics has doubled since World War II. Now don't stop reading because you feel that the soaring surgeon is preaching. He is not. He is just telling you to recognize a problem. And like one of the U.S. Army Safety Center posters states, "Not thinking a thing wrong gives it the superficial appearance of being right." So recognize the problem. And all of you can recognize the problem from private no class to star covered semi-immortal sirs, from junior flight surgeon to master aviator.

"How you say?" The Skydoc was thinking that you would never ask. Again we are not talking about the individual that is entitled to wear the red nosed badge of varsity alcoholism or the fellow who is accustomed to his life in the gutter. Rather we are speaking of the early signs. One of these early signs is that the use of alcohol precedes, rather than accompanies, a person having a good time. Good old John may sneak one or two straight quickies while he prepares one for you. Then alcohol seems to be required to have fun. Fortifying the old self before leaving for a party is such an indication. Later, reasons are invented for using the sauce, such as "coping with stress or anxiety," or having bagged the annual writ. Should you comment on the intake of the early sot, he is likely to show his short temper and tell you to go wrestle an attack dog.

A major phase of advancement in Al K. Hall's school of drinking, is drinking on the sly, drinking faster and earlier, and becoming smashed more often. Guilt sets in for this budding barfly, leading him to make more and more fabricated excuses to justify his drinking. Indeed, not infrequently our hero shows his concern by changing brands, seeking other company or by even swearing off to show to all that he can take it or leave it. Unfortunately, and fortune never goes well with the drinker, at about this time our "social drinker" may substitute other drugs for alcohol, usually barbiturates or amphetamines.

So you see why we feathered doctors of the air are worried. "Well, what can you do now?" First is a confrontation with him, you, his family and the flight surgeon. And don't be moralistic. The J.V. problem drinker needs support, not censure. But he needs a good dose of realism as alcoholism is a disease. For those of you that scoff at such lines and say, "I have heard that one before," had better realize that pretty sophisticated theory stands behind the old Skydoc. When many of the experts believe that alcoholism is caused (pay close attention to what I'm about to say, now) by psychoendocrine disorders existing a priori, such as pituitary-adrenal cortical insufficiency or an imbalance of the hypothalamic-pituitary feedback system, then alcoholism is not just a lack of moral fiber—whatever that is. So even if you didn't understand that, get together with the Nomexed healer who will see that the general health is indeed that, that the liver doesn't feel like a 100-pound box of ball bearings, and that vitamins get into the diet. At this junction, it is important to remember two facts. First is that Good Old John can be treated. Second, alcoholism is a chronic disorder with tendency toward relapse; and it should be approached, from commander to physician, in much the same manner as are other chronic and relapsing medical conditions. In other words, watch him, Hawkeye.

Thus it is time to recognize alcoholism, and to ferret out the individual who is performing at 90 percent of his capacity day in, day out. We all have a responsibility. Ninety percent can generate a catastrophic error, and more than a few people will be as dead as E4 Rotorwatcher. And if you ask the question, "Who me?"—Skydoc will answer, "Yeah, you!"

Tail Rotor Breakaway

Captain M. J. T. Hewetson
Army Air Corps Center
Middle Wallop
Stockbridge, Hampshire
England

Captain Hewetson was assigned as a British exchange officer to Directorate of Training, Lowe Division, U.S. Army Aviation Center, Fort Rucker, AL, when this article was written

"ANY HELICOPTER with an antitorque tail rotor is subject to the possibility of losing total tail rotor thrust for no apparent reason." When a statement like this is made, hands are thrown up in horror and cries of "nonsense!," "... unprofessional!" and similar euphemisms are heard echoing through the corridors of aviation power. The reason is obvious; poor airmanship and overcontrolling by the aviator can result in running out of left antitorque pedal. This is the normal perception of the intent of the statement. However, we are not considering the problem of not having enough tail rotor thrust. What is being addressed is the sudden and abnormal reduction in thrust produced by the tail rotor accompanied by a rapid and large torque increase, caused by some aerodynamic disturbance. It may occur at "mid-pedal setting"; it is the loss of thrust. For want of a better expression, it can be described as "tail rotor breakaway" or "tail rotor stall."

Before studying the conditions required for such an aerodynamic phenomenon, it is worth returning to basics and considering what the tail rotor actually does and how it does it. Let us consider those tail rotors which are mounted on the left, or port side, of the tail boom. From figure 1 it can be seen that to provide antitorque thrust the tail rotor is a "pusher"; its thrust is against the tail boom and fin. This thrust can be considered in the same way as "lift" is explained for the main rotor, so, as we all know:

$$\text{Lift} = CL\tfrac{1}{2}pV^2S$$

Where "CL" is the coefficient of lift, a function of blade design and angle of attack, "p" is air density, "V" is the relative rotational velocity of the blades, and "S" is the surface area of the blades. Any change in any or all of these factors will result in a change in lift, or in this case tail rotor thrust. This basic formula should be borne in mind throughout this study.

The Empire Test Pilot School at Boscombe Down in England made a study of tail rotor breakaway and produced theories for the required conditions; but, as far as prevention of and correction for the phenomenon, their paper was, at best, scant. It is the purpose of this discussion to recount their theories and, without being too presumptive, to suggest some remedies.

In general there are four conditions associated with tail rotor breakaway. The first condition is that of a requirement for high power. The second is a decelerative attitude, hence slight tail-low attitude. Third, this attitude must be held at a low airspeed. Last, and most controversial, a relative wind from the left of 5 to 12 knots is required.

When considering *high power,* the maneuvers to be considered may be any which require a high power setting resulting in a large tail rotor thrust, therefore a high angle of attack. Such maneuvers could be an approach to a hover, or confined area operations at high gross weight (GWT) or high density altitude (DA), or even nap-of-the-earth (NOE) operations.

A *decelerative attitude* will result in the combination of the downwash from the main rotors being reflected from the synchronized elevator, and

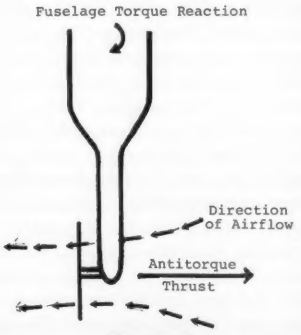


Figure 1

a certain amount of turbulence generated by the airflow passing upwards over the elevator. The result is an opposition to, or a disturbance of, the airflow through the tail rotor. Back to basics again, if the airflow is disturbed over an aerofoil, then lift is reduced. Hence, more pitch to the tail rotor blades is required to produce the same antitorque effect. Therefore, a large angle of attack is needed.

At *slow airspeeds* a high power setting is required unless a rate of descent is accepted. The downwash angle of the main rotor is therefore increased. Once again, the airflow through the tail rotor is disturbed further, resulting in the need for a still larger angle of attack.

The last condition was a *relative wind from the left.* Most aviators would state that a wind from the left is an aid rather than a limitation to antitorque control. However, in so stating, they are considering the effect of that wind on the tail boom rather than on the efficiency of the tail rotor. If the effect on the tail rotor is examined, it can be seen that such a wind would be in direct opposition to the airflow through the tail rotor. The result is a momentary deterioration of the efficiency of the tail rotor. The combined effect of these conditions can cause the tail rotor to stall, hence the resultant uncontrollable yaw to the right; uncontrollable since if antitorque pedal is applied, then the stall deepens. The tail rotor can be said to "break away" aerodynamically. For those who have a mania for vector diagrams, the combined effects of these conditions are simplified at figure 2.

In the September 1977 issue of the ***U.S. Army Aviation Digest,*** there was an article called "How to Crash—By the Book." It depicted an OH-58 Kiowa pilot who was flying NOE in a racetrack pattern downwind, then turning right into the wind, using too much right antitorque pedal. The pilot admitted a very low airspeed. He experienced a total loss of tail rotor control in the turn. By turning right with too much right pedal, he was in effect forcing the tail to the left, inducing a relative wind from the left. His predicament was never explained. Perhaps if one reviews the conditions described above, all of which were present in this incident, it could be said that this aviator experienced tail rotor breakaway.

It is worth considering another yet allied explanation for tail rotor breakaway. When the phenomenon of settling with power is studied with reference to the main rotor system, the conditions required, basically, are a high rate of descent, at low airspeed, and power applied. Now make a comparison with the tail rotor in the described situations. A high power setting is present; a wind of 5 to 12 knots is equivalent to 510 to 1,220 feet per minute, and a wind from the left on the tail rotor is surely the same as a rate of descent; the slight tail-low attitude is attained by the low airspeed. Essentially the conditions for settling with power are the same as those for tail rotor breakaway. Hence, the phenomenon also could be described as settling with power on the tail rotor.

This latter explanation is useful when corrective actions and preventive measures toward the phenomenon are studied. If any one of the required conditions is eliminated, then the aviator has corrected for settling with power or tail rotor breakaway. The corrective actions for settling with power of the main rotor system are to reduce power, or gain airspeed, or both. The same actions correct for tail rotor breakaway. The gaining of airspeed eliminates the tail-low attitude and slow airspeed and thus reduces the requirement for a high angle of attack. This action obviously may not be possible in confined area operations or NOE operations. The other recovery action is just as difficult to perform. To lower the power, or angle of attack, right antitorque pedal must be applied. Since the aircraft is already turning rapidly to the right, such an action is unnatural. However, the result of either action will reduce the yaw.

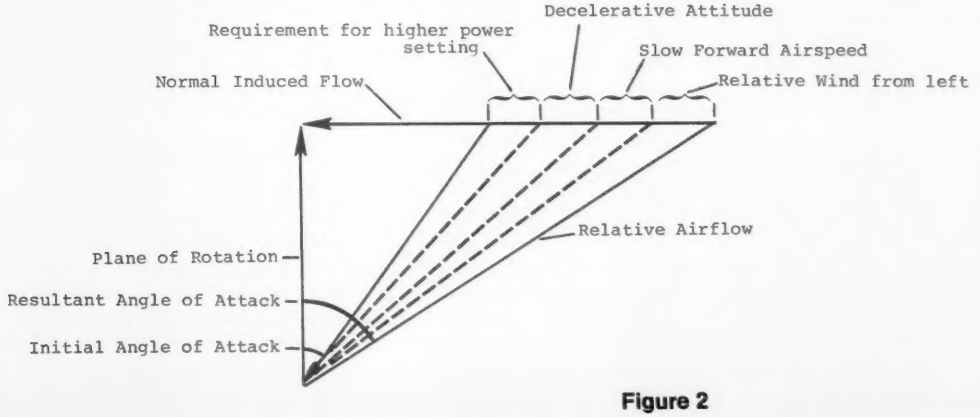


Figure 2

Tail Rotor Breakaway

Tail rotor breakaway is then obviously not a situation that any aviator, in an operational setting, would wish to encounter.

Before concluding with preventive measures, there are two other areas of concern, both of them design features, which can aggravate the possibility of tail rotor breakaway—exhaust gases and the tail fin. At the slow airspeed, tail-low attitude that has been considered, the exhaust gases produce local heating of the air around the tail rotor. The density of this air is therefore reduced. Thinking back to our basic formula, the only way for which this drop of air density can be compensated by the aviator is by an increase of angle of attack of the tail rotor. The tail fin effectively "blanks off" a portion of the tail rotor disc area. By studying figure 3 it can be seen that not only is little thrust produced in this area, but also there is an area around the fin that is nonproductive. In the case of the UH-1H Huey, this total nonproductive area is about one-third of the total tail rotor disc area. If the same area is examined on an OH-58, with its relatively large tail fin, then an even greater portion of the disc area is affected. Due to the design of the tail rotor, the surface area of the blades, and the size of the tail fin, it is suggested here that the Kiowa aircraft is prone to tail rotor breakaway. Conversely, due to the size of the tail rotor blades and the relatively smaller tail fin on the Huey, the phenomenon is less likely to occur.

Therefore, design features may prevent or produce the chances of tail rotor breakaway occurring. Apart from the design features of the tail rotor and the fin there is another feature which would assist in alleviating this problem; mount the tail rotor on the right, or starboard side, of the tail boom, as in the AH-1 Cobra, to yield a more efficient tail rotor.

Having mentioned how design features may alleviate the onset of tail rotor breakaway, it would be highly amiss not to study the preventive actions that an aviator may take. As mentioned above, if any one of the required conditions for tail rotor breakaway can be eliminated, then, it can be proved, prevention is accomplished. The two factors over which the aviator has control, and which should be considered when operating into confined areas at high GWT or high D A, or when operating at NOE, are a relative wind from the left, and the requirement for high power. Power must be monitored closely and demanded with care; the aircraft must always be in trim unless there is a possibility of a tail strike. In that case the tail should be moved judiciously. The possibility of having a relative wind from the left, whether naturally or artificially produced, must be borne in mind and avoided if at all possible.

Without wishing to see any further limitation imposed when operating at NOE or when conducting other maneuvers near the borderline of the aircraft's limitation, this phenomenon must be considered by discerning aviators at all times so that they may carry out their mission successfully. It is hoped that this short discussion of an aerodynamic short fall in helicopter design will help aviators to understand their machines better, and to enable them to prevent a failure of mission due to the environment in which they work.

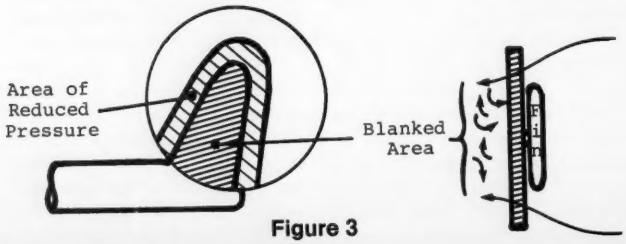


Figure 3

WANTED

YOUR DOCUMENTS, PHOTOGRAPHS OR MEMORIES OF ARMY AVIATION HISTORY

Did you keep a diary or written record of your training in an Army Aviation Program? If so, the *Aviation Digest* would appreciate receiving the originals or copies. They can be as recent as last month, or can date back to the origins of Army Aviation. We also are interested in receiving photographs or other documents significant to Army Aviation history. We promise to return them at your request or we will donate them to the U.S. Army Aviation Museum in your name for retention. Send your contribution to Editor, *Aviation Digest*, P.O. Drawer P, Ft. Rucker, AL 36362, or call AUTOVON 558-6680 or commercial 205-255-3619

1979
A GOOD YEAR FOR ARMY AVIATION

Lieutenant Colonel David C. Ammons

NO SINGLE period of Army Aviation's 38 years can compare with 1979 as a time of history-making changes. It was as if all the past efforts had come together in one grand climax. Excitement was everywhere in the aviation community. Numerous things had happened, any one of which would have been cause for celebration. However, the synergistic effect of several events made the accomplishments of the year almost unbelievable.

In 1979 the Army Chief of Staff declared Army Aviation as a member of the combat arms. Such a decision in essence gave Army Aviation equal status with Infantry, Armor and Artillery. This action recognized the accomplishments of Army Aviation and its future potential. Unless a person is a member of the Army, the significance of such a declaration by the top Army officer cannot be appreciated. This decision virtually guarantees that the capabilities of Army Aviation will be fully exploited in the efforts to win the next war.

Concurrent with this momentous declaration, another decision was issued that was equally encouraging. Specialty 15 (a number code given to a commissioned officer aviator), was designated as an initial entry specialty. Prior to this decision, commissioned officers were required to become branch qualified (in other than aviation) and then serve for 2 years in that branch before attending flight school. Another undesirable feature of the old system was the requirement for alternating

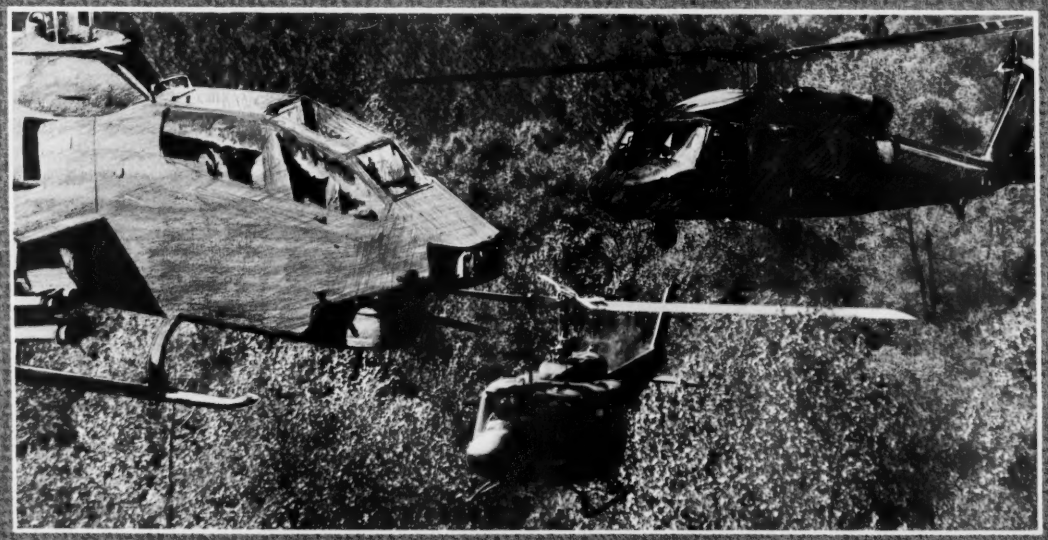
assignments in aviation and branch related fields. Such a system unduly hampered good career progress since the commissioned officer's skills were not fully developed in either assignment.

The designation of aviation (15) as an initial entry specialty permits an officer to attend flight school immediately following completion of the branch basic course. Further, it in essence guarantees the officer and the Army that the aviation skills learned in flight school can be used over an extended period. An officer may be expected to remain in Army Aviation assignments up to his or her 10th year in service. Since the training of an aviator is very expensive, this extended utilization is far more cost effective than the old system. Finally, when officers reach the 10-year point they now are free to seek assignments in a designated alternate specialty. Such a system is compatible with the management of other initial entry specialties.

When the decision to designate aviation as an initial entry specialty is combined with the declaration of Army Aviation as a combat arm, a synergistic effect is realized. Since Specialty 15 is now a combat arm, the officer aviator would be required to select a noncombat alternate specialty. This requirement may result in the selection of a specialty that could be used by the aviation community. For example, an aviator may select a personnel specialty as an alternate and then serve as the adjutant of an aviation brigade.

When the foregoing decisions were put into effect, the position of Army Aviation and its people as a vital part of the Nation's defense was strengthened. Another crucial concept approved in 1979 will add to that strength in the future.

A critical look at the past few years and a gaze into the future revealed an increased array of new and highly sophisticated equipment coming into the Army inventory. Because of this technology explosion and also because of an equally advanced threat from the Soviet Union, a critical examination of the Army of the mid-to-late 1980s was required. Of paramount importance was the requirement to reorganize the Army so as to maximize the effectiveness of all this new equip-



ment. This study of the future centered on the year 1986 and the various sub-parts of the study become known as Division 86, Corps 86, and echelons above corps. Since the development of the new organizations resembled a building block approach, Division 86 received the most attention initially.

Division 86, while certainly not limited to Army Aviation, concentrated heavily on the exploitation of Army Aviation capabilities. To this end, the U.S. Army Aviation Center, Ft. Rucker, AL, in coordination and cooperation with other elements of the Army, developed an organizational concept called the Air Cavalry Attack Brigade (ACAB).

The ACAB would be a fourth brigade in every division, thus giving the division commander an additional maneuver headquarters with which to fight the combined arms battle. The ACAB consolidates all division aviation assets into a brigade size force whose mission is to find, fix and destroy enemy armor and mechanized forces, provide command, control and liaison, and provide aerial assets to division artillery and the other maneuver brigades. The concept was approved in 1979 and is another of the year's Army Aviation highlights.

Of course, much remains to be done to refine the concept and to develop the optimum organization for Division 86. Yet, the approval of the concept was a most important milestone in the development of the new organization. Variations of the ACAB are being studied as well as the flexibility for mission restructuring. This organizational concept probably is the most revolutionary development in Army Aviation since the development of the helicopter. It addresses the full utilization of the capabilities of the equipment now in the inventory and also that planned for the near future.

No development, especially an organizational one, can be implemented without affecting other components that relate to that organization. The new ACAB will be a pyramid structure in its internal command structure, thereby permitting a natural internal command progression. In line with the initial entry Specialty 15, the ACAB provides an organization that permits commissioned aviators to progress in their careers with opportunities equal to all other Army officers. In short, the ACAB provides for the full utilization of new equipment and at the same time is an ideal structure for career development.

Army Aviation, past, present and future, is a very valuable member of the Army team. Its past history has been a bright and glorious one. Its present is exciting. But, its future is the brightest of all.

ABOUT THE AUTHOR

LTC David C. Ammons was graduated 28 May from the Air War College, Maxwell Air Force Base, AL. His new assignment (duty unknown now) will be at Ft. Benning, GA. The author is a veteran of 21 years military service and has been an Army aviator for 17 of those years. He is dual rated and wears the wings of a Master Army Aviator.

NO MORE BEAVERS

L-20/U-6

COLORS HAVE BEEN struck for the L-20/U-6 Beaver fixed wing aircraft which has served the U.S. Army since 1951.

The last two, which had been used as observation planes in Berlin for almost 20 years, have been turned in by the 70th Transportation Battalion at Coleman Army Airfield, Mannheim, Germany. It was determined that they were no longer practical to use because spare parts were not easily available.

A product of de Havilland, a Canadian company, the Army's L-20 (the designation was changed to U-6 in 1962) was a single engine, six-place aircraft. It had a wingspan of 48 feet, a maximum speed of 156 miles per hour and could operate on wheels, skis or floats.

The Beaver was used by the Army in the United States as well as overseas in Panama, Europe, Korea and Vietnam for courier, liaison, observation and photography flights. It also served as a cargo carrier and an aerial ambulance.

F. G. Swanborough, in his book "U.S. Military Aircraft Since 1909," states, "Because it was used regularly by Generals Van Fleet, Ridgeway and Mark Clark [in the Korean War] it became known as 'The General's Jeep,' but its biggest task was the transport of casualties from the front."

Fixed wing aircraft in the active Army's standard inventory now are the T-42 Cochise, U-21 Ute, OV-1 Mohawk and the C-12 Huron.

There's A Song In The Air

For Army Aviators

Betty Goodson
Staff Writer

HERE'S A QUESTION for all whose hearts are still cloaked in Gray: Do you believe the South would have won the big war if its bands had been better?

The importance of music to the Civil War was attested to by Blue-clad General Philip H. Sheridan when he said, "Music has done its share, and more than its share, in winning this war," and by that great man, General Robert E. Lee, who remarked, "I don't believe we can have an Army without music." (Quotes from "A History of Military Music in America" by William Carter White, 1977.)

Granted, that subject is too many quarter notes away for a logical discussion; so here's a question to bring the matter home to members of today's U.S. Army (and praise the Lord it is united) who wear aviator wings: Do you know there is a song dedicated to you and the service you give America?

Appropriately titled "The Army Aviation Song," it was composed by the famous songwriting team of James Van Heusen and Sammy Cahn and was first played by the U.S. Army Band in a concert 29 September 1963 at the Hollywood (CA) Bowl. The Honorable Stephen Ailes, undersecretary of the Army, was there to acknowledge its official acceptance.

Two civilian firms, Douglas Aircraft and Hughes Helicopter, contributed to the song's production, including sheet music and records. The 33 rpm recordings were by Mitch Miller and his orchestra and chorus.

Proceeds from sales of the music and records were assigned by the songwriters and Mr. Miller's organization to the Army Aviation Association of America (AAAA) Scholarship Foundation (which still has sheet music available). To give further recognition to "The Army Aviation Song," it was featured soon after its publication on the national television show, "Sing Along With Mitch."

Of course the Van Heusen/Cahn composition is not the first musical tribute paid to Army aviators. For instance, printed on the program for a pilots' class which graduated 18 November 1943 at Denton, TX, is "The Grasshopper Hymn" (author not given). Three of its lines are: "In and out through the trees—We're as hard to find as fleas,—We're the eyes of the artillery."

In addition to showing the kind of songs Army aviators had for inspiration more than three decades ago, those lines also reveal that nap-of-the-earth flight is not just for helicopters. The Grasshoppers described as flying through the trees were fixed wing aircraft!

Meanwhile, back with the band: In his book, Mr. White notes that when the Continental Army was formed in 1775, the principal instruments used in its units were the fife and drums. With those, the musicians provided "one of the prime essentials of camp life . . . from reveille to taptoo . . . ."

Music, instrumental and vocal, has continued through the years to be a "prime essential" for the men and women in this country's service.

Chants have always been a favorite kind of morale builder; and cadence has been counted by Soldiers in various ways, often under adverse circumstances.

In his book, "Over There With O'Ryan's Roughnecks," William F. Clarke states: "When we had reached the bottom of our well of despair, someone would start to sing one of our favorite tunes. Gradually, the singing would spread up and down the column, and our despair would be washed away."

Right now, U.S. Army members do not have such motivation; but they still enjoy their chants and other music. That is proven by the collections the 1st Aviation Brigade at Ft. Rucker, AL has made and published in a "Warrior Song Book" and a booklet of "Jody Calls" (now in its second edition). The song titles range from "Ballad of Aviation Warrant Officers" to "The Army Keeps Flying Along" to "The Ballad of Brasso Bill." They and the jodies were written by air traffic control students, battalion and company commanders, chaplains, engineers, student and rated aviators—everybody at Ft. Rucker who wanted to rhythmically express their feelings about Army life.

The authors of the music used "from reveille to taptoo" at Ft. Rucker or Hood or Carson or Wainwright or wherever are not famous songwriters. Their compositions will probably never be put on sheet music or played by a big-name orchestra as "The Army Aviation Song" was. However, those writings are important because they are adding to the Army's musical heritage which started more than 200 years ago.

Now, if all of you musicians from the South will just gather around, we'll work on that harmony a little more.

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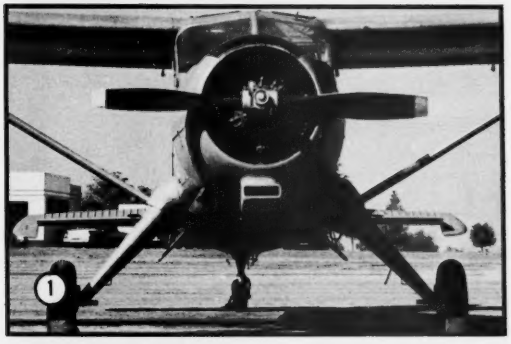
RECOGNITION QUIZ

This is the first in a series of recognition quizzes the ***Aviation Digest*** will be carrying. Each month we will be showing you a portion of an aircraft or some other equipment normally found in the combat area. The next month we will show you the full view with a note or two about each aircraft, etc.

THIS MONTH'S HINT: 6 June 1980 is Army Aviation's 38th Birthday, so this issue accents *history*. Also, we've tried to trick you with a couple. See you next month.



ATC ACTION LINE

UNITED STATES ARMY COMMUNICATIONS COMMAND

AVIATION IS an exciting career. At times it can be even more exciting than one would expect.

Aerobatics were once the rage and barnstormers made a good salary doing them, even during the depression. In today's aviation environment inadvertent aerobatics can occur due to wake turbulence encountered when following heavy jets too closely. Sometimes these inadvertent aerobatics happen during the takeoff or landing phases of a flight. A good example is when a "heavy" conducts a visual approach from way up high and dives it to the runway, followed by another aircraft making an ILS (instrument landing system) or some other type of approach about 5 or 6 miles behind. A description of what may occur is contained in the following Flight Safety Awareness Report submitted to an airline by one of its pilots:

"We were on final approach for Runway 34R at Seattle-Tacoma, in a B-727QC, when we encountered wake turbulence of such a magnitude at 200 feet AGL that momentary control of the aircraft was lost. Full power was applied instantly and recovery was made about 50 feet AGL.

"We made a stabilized 30-degree flap approach 5 miles in trail of a B-747 cargo liner. Weather was no factor and wind was 320 degrees at 6 knots.

"The unusual factor was that the B-747 flew an approach profile about 1,000 feet above the normal glide slope and initiated a go-around at about 800 feet above the approach end of the runway. Its weight at go-around was about 530,000 pounds.

"Our weight was 128,000 pounds, 40 degree flaps, and stabilized speed was 130 knots. The air was perfectly smooth until about 200 feet AGL when we were struck by a violent downdraft. In my opinion the aircraft actually quit flying. We do not know how much airspeed was lost but there was no 'stick shaker.' The rate of descent was of a destructive nature, prior to recovery. Upon recovery, the aircraft was aligned with the runway and a normal landing was accomplished. The 5-mile-in-trail separation was verified by both tower and approach control."

This was an unusual condition, but it happened. In this instance both the 727 crew and the air traffic control personnel followed all the right procedures but the 5 miles separation was not enough. This hair-raiser could have happened even if the 747 had landed and it doesn't take much imagination to picture what the result would have been to *any* Army aircraft. When you are flying in the same general airspace with the heavies, stay alert!